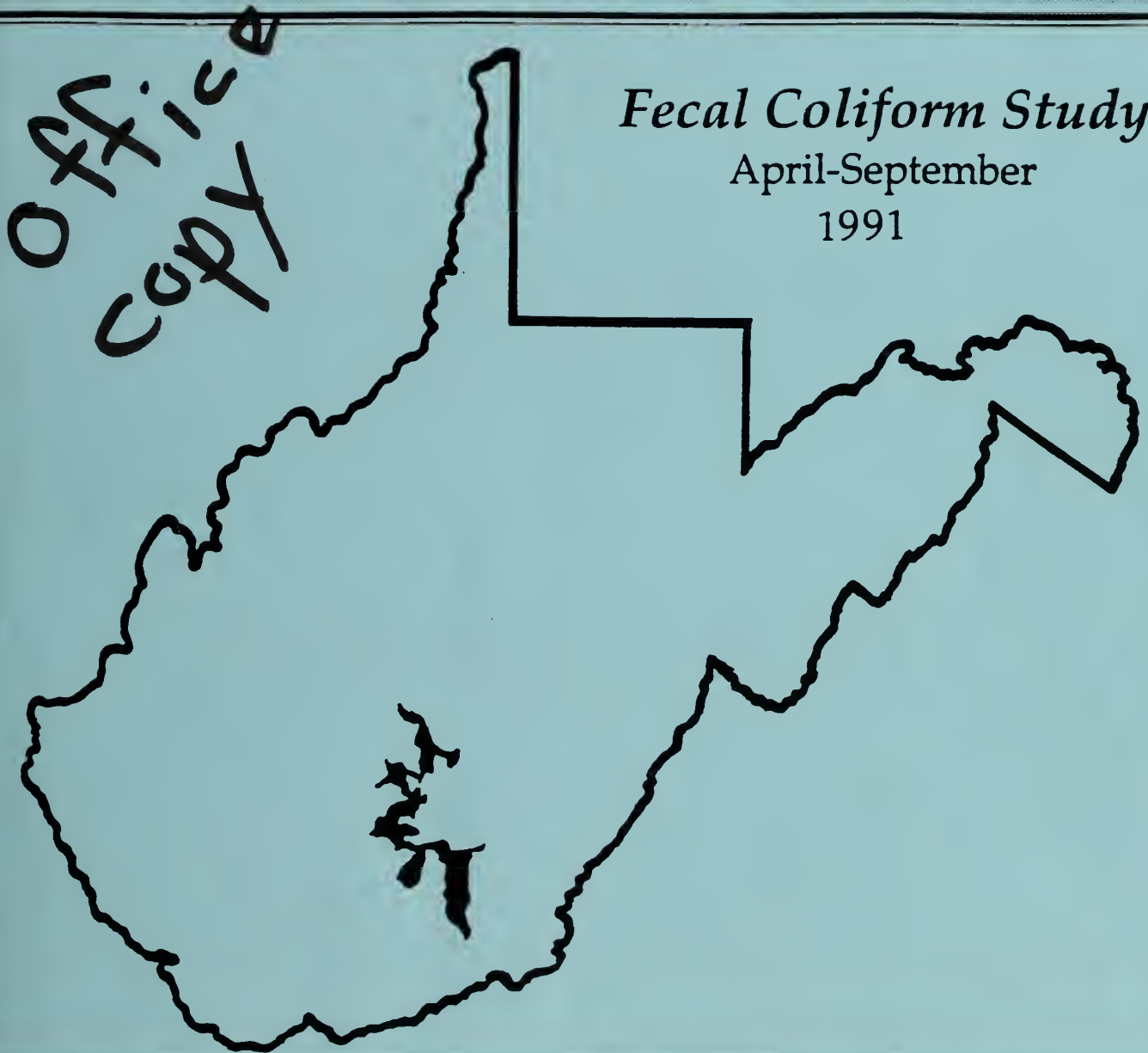


NEW RIVER GORGE National River

Fecal Coliform Study
April-September
1991



National Park Service
New River Gorge National River
Division of Resource Management
and Visitor Protection
Resource Management Section



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NEW RIVER GORGE NATIONAL RIVER
FECAL COLIFORM STUDY
APRIL-SEPTEMBER
1991

Submitted by:
Scott W. Hebner

For New River Gorge National River
Resource Management and Visitor Protection
Resource Management Section

Published November, 1991

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Natural Resources, "New River Gorge National
River: Fecal Coliform Study, April-September
1987-1988."



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Introduction

This report presents the data from the 1991 fecal coliform study and is a continuation of the water quality studies conducted at the New River Gorge National River (NERI) since 1980. Any visible trends between fecal coliform counts, stage level and 48 hour precipitation (48prcp.) will be discussed. Recommendations for 1992 will also be presented.

NERI is on a stretch of the New River flowing north from below the Bluestone Dam, near Hinton, West Virginia, to just north of the U.S. Highway 19 bridge near Fayetteville, West Virginia. The headwaters of the New River are located high in the Southern Appalachian Mountains in northwestern North Carolina. From Blowing Rock, North Carolina, the New River flows generally in a northward direction across southwestern Virginia and enters West Virginia 163 miles from its source. The river continues flowing northward for 87 miles to Gauley Bridge where it joins the Gauley River and forms the Kanawha River. The Kanawha River flows northwest to Point Pleasant, West Virginia and joins the Ohio River, which is part of the Mississippi watershed. From the New River's headwaters in Blowing Rock to Nitro, West Virginia the New/Kanawha River's course follows that of the ancient Teays River, which began forming as the southern Appalachians rose out of an ancient ocean. Mountain uplift and subsequent erosion have exposed many types of rock in the basin, most typical are shales, sandstones and limestones. On its journey to the Gorge, the New River passes through extensive karst (an area of limestone formations) areas and gathers water from other streams that drain these calcareous lands. Consequently the New River is a well-buffered, biologically productive stream (WVDNR 1987-88, p.9).

NERI was established by the United States Congress in 1978 and placed under management of the National Park Service (NPS), part of the United States Department of the Interior. Title XI of the National Parks and Recreation Act of 1978 (Public Law 95-625) set aside a 62,000 acre corridor along 52 miles of New River". . . to conserve and interpret the outstanding natural, scenic, and historic values and objects in and around the New River Gorge and preserve as a free-flowing stream an important segment of the New River in West Virginia for the benefit and enjoyment of future generations. . ." (WVDNR 1987-88, p.1).

In considering the mandate of the NPS and NERI, the park became interested in the quality of the water resources found within the park boundary (park watershed). In 1980 NERI began a water quality program to build baseline data upon which future monitoring and management activities could be built. Since the West Virginia Division of Natural Resources (WVDNR) was interested in establishing baseline water quality data for some tributaries of the New River, and NERI, in its fledgling stages, lacked proper laboratory facilities, the two joined in a cooperative agreement. From 1980 to 1984 the WVDNR did water quality studies for NERI. These studies looked at several parameters commonly related with commercial and domestic pollution (ie. total aluminum, total cyanide, total iron, fecal coliform etc.). After examining the data from 1980-1984 NERI determined that sewage and/or animal wastes were a major cause for concern because of the large amount of human body contact with the New River. In 1985 NERI attempted to begin monitoring for fecal coliform, the accepted indicator for sewage and animal waste contamination (SM 901A.), with Colicount samplers (from Millipore Corporation). This method is quick and inexpensive but it is not an EPA approved method. An unpublished report by NERI on the 1985 sampling effort recommended the use of an approved standard method and an approved laboratory for future bacteria monitoring efforts.

In 1986, based on these recommendations, NERI contracted with the USDA Appalachian Soil and Water Research Lab Facilities to use their lab to analyze fecal coliform samples. The membrane filter technique (SM909C), an EPA approved analytical method, was used with satisfactory results. In 1987, because of staff changes at NERI, it was decided again to contract with the WVDNR to do fecal coliform studies on the New River and selected tributaries. The result of this agreement was the "New River Gorge National River Fecal Coliform Study, April-September, 1987-1988" done by WVDNR. After reviewing the results of the 1987 and 1988 fecal coliform study, NERI decided that a less intensive and more extensive effort would suffice to keep a check on fecal coliform (WVDNR 1989, p.1). Thus in 1989 NERI instructed the WVDNR to reduce the number of sample runs per month from 5 to 1. In doing so, they were able to add four new tributary sites to the sampling regime at a lower cost. At the same time the WVDNR also sampled 18 tributaries, some of these repeats of the 1989 study above, for other water quality criteria. In 1990, in an effort to train personnel and begin the set-up of an approved water quality lab, NERI staff took over the fecal coliform studies from WVDNR and again conducted the studies with assistance of the USDA lab in Beckley. The WVDNR continued to sample sites for other criteria other than fecal coliform. Over the winter of 1990/91 much preparation was done for the debut of the 1991 fecal coliform study, performed by NERI staff in the newly equipped NERI water quality lab. In future years NERI is planning to carry out at least 6 more parameters on these sites on a quarterly basis.

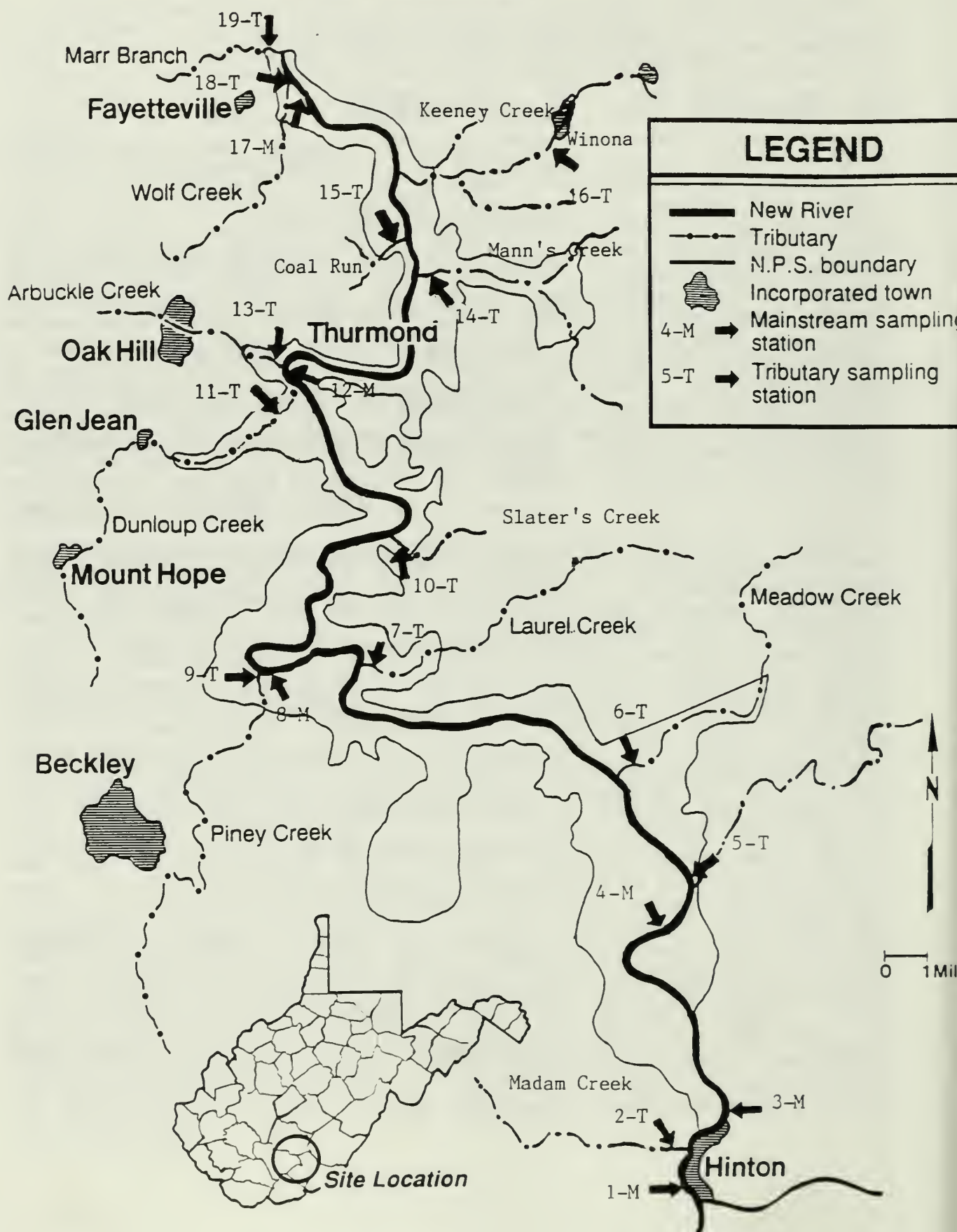
TABLE 1: NEW RIVER GORGE NATIONAL RIVER
FECAL COLIFORM SAMPLING SITE LOCATIONS

<u>MAP CODE</u> (FIGURE 1.)	<u>STATION LOCATION</u>
1-M	New River at Hinton New River Gorge — National River, Visitor Center
2-T	Madam Creek near mouth ✓
3-M	New River below Hinton sewage plant ✓
4-M	New River above Sandstone Falls ✓
5-T	Lick Creek at stream gage site ✓
6-T	Meadow Creek at stream gage site ✓
7-T	Laurel Creek at Quinnimont (at stream gage site) ✓
8-M	New River at Prince (midpoint on bridge) ✓
9-T	Piney Creek at McCreery (stream gage site) ✓
10-T	Slater's Creek at Thayer (near mouth) ? <i>dropped?</i>
11-T	Dunloup Creek at stream gage site ✓
12-M	New River at Thurmond (below Dunloup Creek, river right)
13-T	Arbuckle Creek at stream gage site ✓
14-T	Mann's Creek near mouth ? <i>changed for 1992?</i>
15-T	Coal Run near mouth ✓
16-T	Keeney Creek at Winona ✓
17-M	New River at Fayette Station (swimming area) ✓
18-T	Wolf Creek at mouth ✓
19-T	Marr Branch below Rivers, Inc. campground ✓

Figure 1: A map of the sampling area for the 1991 fecal coliform study at NERI.

Map of New River Gorge Fecal Coliform Study Area

April - September, 1991



MATERIALS AND METHODS

The study was conducted in south central West Virginia at the New River Gorge National River. The National River flows through Fayette, Raleigh, and Summers Counties. All but three of the 19 sample sites are in the National River Boundary. The three outside of NERI's boundary are 1-M, New River at Hinton Visitor Center (VC), 2-T, Madam's Creek in Hinton, and 16-T, Keeney's Creek in Winona. The sampling sites are listed in Table 1, and Figure 1 shows their relative locations. For the sample sites in Figure 1 and Table 1, "M" denotes mainstem sites while "T" indicates tributary sampling sites. Sample sites for 1991 were identical to the sites for the "New River Gorge National River: Fecal Coliform Study, April-September 1990." The tributary sample sites were done as close to the New River confluence as possible in order to give adequate assessment of all the pollutants entering the river. Mainstem sites were sampled at areas of high public contact and as close to the river current as possible. Collection from the New River at Prince (M8) involved lowering a bucket into the river from the Prince Bridge and taking the sample from the bucket.

The sampling sites were divided into two districts, north and south. The south district included the sites 1-M through 9-T and the north district included the sites 10-T through 19-T. In 1990 it was decided that the north district sampling runs would be divided in half to facilitate analyzing the samples within 6 hours. Four sites were done on one day and 6 sites were done on the next day. Each district was sampled biweekly on opposite weeks. For example, if the south district was sampled on the 1st and 3rd weeks of a month the north district would be sampled on the 2nd and 4th weeks.

The time period of collection coincided with the summer recreational season for the New River. There are approximately 23 whitewater rafting companies that operate commercially during this period. The New River also attracts other whitewater enthusiasts from around the United States and is used for swimming, fishing, camping and other activities during the year. In summer the weekday pace is slow, but weekends are crowded with rafters, kayakers, canoeists, anglers, and swimmers. Occasionally temporary high seasonal flows in the Fall, Winter, and Spring will attract recreationalists, but this use is small compared with the use by the summer crowds. Since NERI recreational opportunities are largely based around the river, and most involve body contact, it was decided that fecal coliform would be the minimum criteria to study. As time progresses other parameters will be added to the scope of the water quality studies at NERI. Most of the methods

used for the "New River Gorge National River: Fecal Coliform Study, April-September, 1991" are found in "Standard Methods for the examination of water and wastewater: 16th edition" from here on referred to as SM.

Sampling bottles were 250ml and 500ml plastic Nalgene bottles. In order to bind any residual chlorine that may have been released into the streams, a dechlorination agent was added to the sample bottles; this was done in agreement with SM 906 A.2. The bottles were then sterilized in an autoclave for approximately 15-18 minutes at 127 degrees Celsius and placed in the drying cycle for 15 minutes.

Water samples were collected, according to SM 906 A.3.e., on a biweekly basis. The sample bottles were then transferred to a 24 quart cooler with ice and transported, within 6 hours, to the lab for analysis. This complies with SM 906 B.

Once in the laboratory the samples were analyzed for Fecal Coliform based on procedures described in SM 909 C. The filtering apparatus was a Millipore OM 037 glass 47mm filter holder. Commercially prepared M-FC media, contained in 2.1ml ampules, and sterile pads/filters, (Sterilized MSI cellulosic, white grid, 0.45 micron, 47mm., with pad) were used in the filtration. The sample filters were placed in disposable plastic petri dishes and heat sealed in a plastic bag. The bags with the sample filters were incubated for 24 $\pm$ 2 hours at 44.5 $\pm$ 0.2°C. After the incubation the Fecal Coliform densities were calculated according to SM 909 C.3 general formula:

$$\text{Fecal coliform colonies per 100ml} = \frac{\text{Coliform colonies counted} \times 100}{\text{ml sample filtered}}$$

The "West Virginia Water Resources Board for protection of recreational use and public water supply", WVWRB, has set a standard of no more than 200 counts of fecal coliform bacteria per 100ml (WVDNR 1987-88, p.1) expressed as a geometric mean based on no less than five samples per month. The geometric mean can be calculated by one of two formulas:

$$\text{GM} = n \sqrt[n]{(\text{FC1})(\text{FC2}) \dots (\text{FCn})}$$

or

$$\text{GM} = 10^{\frac{[(\log \text{FC1}) + (\log \text{FC2}) + \dots + (\log \text{FCn})]}{n}}$$

where GM = monthly geometric mean.

FC1, 2. . .n = fecal coliform bacteria value for sample number 1,2. . .n.
 n = total number of samples during month (WVDNR 1987-88, p. 9).

Due to fiscal restraints, only two samples were taken per month. Thus the results must be looked at as an indicator of streams that may have exceeded the above standard. Interpretation of the results of the 1991 New River study has been based primarily on whether a stream met, or failed to meet, this criterion (NERI 1990, p. 5).

When the samples were taken date and time were recorded as well as 8 other parameters. See Appendix A-1. The 8 parameters are water temperature, air temperature, pH, stage level (if applicable), water condition, dissolved O₂, weather, and conductivity. Water temperature and conductivity were determined with a YSI model 33 conductivity meter. The dissolved O₂ was determined with a YSI model 51B dissolved O₂ meter. Air temperature was determined with an alcohol thermometer. PH was detected with a "pH pen" made by Fisher. Water condition and weather were subjectively determined by use of a written scale illustrated in Appendix A-2. The stage level for the following sites, T-5, T-6, T-7, T-9, T-13, T-19, was determined by United States Geological Survey staff gauges. Site T-11 was a weighted cable gauge, M-12 was a remote gauging station near Thurmond West Virginia, and M-17 was calculated from M-12 by using the following formula:

$$\text{Thurmond Reading} \times 4/3(1.33) - 4 \ 2/3(4.67)$$

The stage level for the south district run was from the recorded phone message at the Bluestone Dam. Gauge phone numbers and information is listed in appendix A-3.

RESULTS and DISCUSSION

The concentration of fecal coliform bacteria was examined on six sites of the New River and 13 tributaries. The following section presents the results of these examinations along with a discussion of possible explanations for these violations, in relation to the 48 hour precipitation and water level. It must be noted that use of the term "violation" is relative in this report. The standard for fecal coliform is no more than 200 fecal coliform colonies per 100 milliliters of sample. This will be reported as MFC/100ml, which stands for Membrane Filter Count per 100 milliliters of sample. This part of the standard is legally valid in the context of 5 separate samples per month. If the geometric mean of the 5 samples exceeds 200/100ml, then the sample site is considered to be in violation of the standard. The second part of the standard states that if more than 10% of the samples exceed 400/100ml, then the sample site is also in violation. Since NERI only sampled 2

times a month the standard cannot be legally applied to our results. But for this study a reading of more than 200/100ml will be used to point out bodies of water that may be in violation of the standard.

Each site will have a corresponding figure that will display the MFC's for that site in 1991 (figures 2-20). Appendix-4 through Appendix-10 corresponds with figures 2-20. Appendix-11 will have a list of all the raw data arranged by site and date. Appendix-12 contains the comments that correspond with the information in Appendix-11. For a more complete description of the sampling site locations see the Results and Discussion section of "NERI Fecal Coliform Study 1987-1988."

1-M, New River at Hinton, NERI Visitor Center (See Figure 2).

This site had one violation of 237/100ml on May 30. In 1990 there were zero violations and in 1989 only one violation was recorded. Five of the 8 readings were below 37/100ml. The May violation of 237/100ml corresponded with an increased runoff upstream, indicated by turbidity and increased dam flow. Generally speaking, the results suggest acceptable levels of fecal coliform with occasional fluctuations above the standard.

2-T, Madam Creek near the mouth (See Figure 3).

Fecal coliform concentrations for 1991 were again very high. Six of the 8 MFC readings exceeded the standard and 3 were more than 15,000/100ml. The two highest readings, 22,000 and 24,000, occurred at Madam's Creek. Although only 2 samples were completed per month, these numbers strongly suggest that water from Madam's Creek flowing into the New is in violation of the WVWRB standard.

The Madam Creek watershed is probably affected on the lower end by grazing and domestic sources. All along the creek there are residences and some pasture land lies in the watershed. The sample site was on stream left immediately down stream of the River Road bridge that crosses Madam's Creek. This creek was first sampled in 1989 and at that time it was found that it contained heavy loads of human and/or animal waste.

No real correlation can be drawn between MFC's and the affect of water level, water condition, and precipitation. The highest reading occurred after 0.0" of 48prcp. and the next 2 highest occurred after the two greatest rain events, 0.62" and 0.59" of rainfall. Two of these readings were taken during clear water conditions and one was taken during murky conditions. With the limited number of sampling occasions, and the difference in rainfall events, it appears that rainfall did not significantly influence the water quality of Meadow Creek.

3-M, New River below Hinton Sewage Treatment Plant (Figure 4).

This site is a mainstem site on river right about 30 meters downstream of the effluent of the Hinton Sewage Treatment Plant. The readings for this site are the highest for any site sampled in 1991. The largest count was 224,000/100ml, more than any of the other readings. Two other occasions, June 27, and July 11, had counts above 20,000/100ml.

Since this site has been sampled, the Sewage Treatment Plant (STP) has struggled to meet state standards for effluent. Differences in river flow, overflow from the STP, and degree of treatment cause variations in fecal coliform counts (WVDNR 1987-1988, pg.27). Fortunately, in July of 1991 Hinton came on line with a new STP. The closing of the old STP is reflected in the last two counts. These low figures represent the New River at that site without any effluent entering the river. The old sewage plant had a definite affect on the quality of this section of the river. Continued sampling at this site should reveal a marked decrease in fecal numbers. In 1992 this site should be abandoned and replaced with two or more sites below the new Hinton STP. One might be placed near the STP and another might be placed further downstream.

4-M, New River at Sandstone Falls. (Figure 5)

This site had zero violations in 1991 and in 1990. The highest count in 1991 is 98/100ml, the rest fall below 59/100ml. This would seem to suggest that the site is in fairly good shape. On the day of the highest count, the Hinton STP had one of its lowest counts (before the closing of the old STP). This probably indicates that this site is not influenced by the STP since it lies on the other side of the river and is seven miles downstream. The WVDNR indicated that the distance, lack of lateral mixing, and aerobic conditions in the river all lessen the chances of survival of fecal coliform (WVDNR 1988-1987, p. 27). In previous years this site has had violations, (1989:3, 1988:4, 1987:7). No definitive explanation can be given for this supposed improvement of fecal levels. Possible past contributions to fecal levels were cited as the influx of raw sewage from summer residences and a local population of ducks. Perhaps some of the summer residences upstream have improved their septic systems, cited as a possible contributor (WVDNR 1987-88 p. 28). Another possibility is that since 1989 NERI has improved the camping/day use area, providing bathrooms, designated campsites, and enforced length of stay regulations. This may have concentrated human waste in proper waste facilities rather than allowing the waste to end up spread across the area.

5-T, Lick Creek at stream gage site. (Figure 6)

One count was above the standard in 1991; it occurred on July 11, and was 325/100ml. Two other readings were above 100/100ml and the rest fell below 55/100ml. The effect of rain and stage level did not have as predictable an effect as in 1990. Therefore no

conclusions can be drawn using the 1991 data. On the day with the highest 48 hour rainfall recorded (7/25), the reading was 44/100ml. The highest stage level, 2.00' yielded a reading of 100/100ml.

6-T, Meadow Creek at stream gauge site. (Figure 7)

This site had one reading, 450/100ml, that exceeded the standard on July 11. As mentioned in previous reports this site is located downstream of Meadow Creek's STP. Normally this plant was not considered a problem, based on its past records. Thus previous patterns on this creek were said to have followed a seasonal fluctuation affected by non-point sources of pollution (WVDNR 1987-88, p. 30). Although the first 3 of 4 readings (spring) were higher than the second 4 readings (summer) no real trend in relation to flow and rainfall can be determined. The highest reading, 450/100ml on July 11, came with a flow of 1.34' and 0.39" 48 hour precipitation. The very next sample was 63/100ml, on July 25, and it had a flow of 1.94 and precipitation was 0.62".

7-T, Laurel Creek at Quinnimont. (Figure 8)

This site had no readings above the standard. The highest reading was 79/100ml on July 11, and occurred with the third highest flow 6.1' and the highest precipitation, 0.39". This site continues to exhibit low levels of fecal coliform. There was only one violation in 1990 and in 1988 and 1989 the stream was not sampled because the 1987 levels, determined by the WVDNR, were low. It is possible this site could be dropped from the fecal coliform monitoring for 1992. NERI may want to sample this site for other parameters but the fecal results seem to show acceptable levels.

8-M, New River at Prince. (Figure 9)

The New River at Prince had one reading, 405/100ml on May 30, in excess of the standard. The rest of the readings were below 28/100ml. For this sample the 48 hour precipitation was 0.0 and the flow was 3.80'. This high flow was probably responsible for the high fecal coliform count. There may have been a large run off upstream of the sampling area, causing these high fecal coliform levels. It should be mentioned that this is the only midstream sample site on the New River.

9-T, Piney Creek at McCreary. (Figure 10)

Piney creek exhibited some of the highest readings for any of the New River Tributaries tested. Piney creek had 4 readings well in excess of the standard. These were, 653/100ml on July 11, 1200/100ml on July 25, 6350/100ml on August 8, and 1320/100ml on August 21. The creek also had two readings above 158/100ml on 5/30 and 6/27. It is obvious that the STP facilities in Beckley and

North Beckley still present a problem for the creek (NERI 1990, p. 11). The results for 1991 are not as bad as in 1987-1989, but they suggest problems for the stream. The pattern of high counts in the spring and lower counts in the summer, talked about in the 87-88 report, did not hold true in 1991. The 4 highest counts came in July and August. Three of these four may have been due to the high flow level and rainfall. On the other hand, the third highest reading along with the 5th and 6th highest all came on days of high flow but 0.0 precipitation. Possibly Piney Creek received runoff before the 48 hour precipitation period and this may have influenced those high counts, (this is based on the higher flows exhibited).

Because this site is a public access for middle New boat and kayak trips, Piney Creek needs to be continuously monitored for fecal coliform. It might be suggested that a high flow month and a low flow month be sampled at least five times in the month to reestablish that this creek is in violation of health standards for fecal coliform.

10-T, Slater's Creek at Thayer. (Figure 11)

One violation of 593/100ml occurred on May 30. This occurred after only a trace amount of precipitation in 48 hours(48prcp) and it was the only day that this creek was recorded as being turbid; at all other times it was recorded as clear. No conclusions can be made based on flow levels because this creek has no staff gauge. A local land owner noted that a very high flushing flow washed through the night before the sampling occurred. He suggested that it seemed as if an impoundment or beaver dam broke allowing an excessively high amount of water to wash into the river. He reported the lower end of this property as being flooded. This fits with WVDNR comments about the effect of flushing flows on this creek (WVDNR 1987-88, p. 31). It is quite possible that its turbid condition was due to this flushing flow which could have been caused by high rain before the 48prcp reading, or the large surge of water from a natural or man made impoundment breaking. This creek has had one violation for the last 3 years, this seems to show a fairly good condition for this stream.

11-T, Dunloup Creek at stream gauge site. (Figure 12)

This site had 7 (out of 8) MFC's above 200. The 2 highest readings were 600/100ml on June 19, and 1340/100ml on July 30, the next four were above 300/100ml and the last one was 235/100ml. In looking at the flow rates and precipitation, no real conclusions can be drawn as to their effect on the fecal coliform levels. The highest count occurred during a lower stage level and the highest 48prcp. period. This precipitation may have washed more fecal waste into the stream or caused overflow problems at the 2 STP's. The 2nd highest number occurred after the highest recorded stream level and a small rain event (trace). It is possible that rain may have occurred further

before the 48prcp. This may have caused the levels in the stream to elevate for a couple of days. Dunloup's watershed is affected by several small communities and 2 sewage treatment plants. These are the Mt. Hope STP and the White Oak Public Service District (PSD). Both of these facilities have infiltration/inflow problems that cause overflows on occasion. The Mt. Hope plant is overloaded and bypasses only partially treated sewage frequently (WVDNR 1987-88 p. 32).

Evidence of these problems can be seen in the fecal coliform counts for 1991. These readings on the average are higher than the readings for 1990 and just below the figures for 1989. Occasionally an odor could be detected by the ranger sampling downstream of the White Oak PSD. This and the fact that Dunluop Creek is used for fishing and as a boat put-in indicate that continued monitoring is a definite need on this creek.

One bright spot, the 1992 season could possibly see a slight improvement in fecal levels. The Register Herald reported that the White Oak PSD is seeking Public Service Commission approval of an \$875,000 sewer improvement project. The plant plans to install a grit chamber, modify the aeration system, and construct a clarifier, a contact tank and a post aeration facility (Registrar Herald, Oct. 12, 1991, p. 5A). Hopefully this will vastly improve the fecal coliform readings on this scenic stream.

12-M, New River a Thurmond. (Figure 13)

New River at Thurmond displayed a fairly healthy level of fecal coliforms. One reading on June 19, exceeded the level, it was 500/ml. It is hard to determine why this reading was high. The flow was average and the precipitation was only a trace. It is possible that Dunloup Creek influenced the reading. On this date it recorded its 2nd highest reading, 600/100ml. Since the 12-M sight is below the confluence of Dunloup and Thurmond rapids, it is conceivable that enough mixing occurs in this rapid to mix in the inflow of Dunloup. Obviously no definite conclusions can be made on just one reading.

Since the quality of this site was quite high I might recommend that the site be moved to the downstream end of Thurmond on river right to collect effects of runoff in Thurmond or on river left, below the Thurmond rapids, to collect data on the Dunloup inflow.

13-T, Arbuckle Creek near the gauge site. (Figure 14)

This site exhibited a decrease in quality from the 1990 season. In 1991 Arbuckle Creek was above the standard for 6 out of 8 sampling periods. The highest was on June 19 with a reading of 3940/100ml. The 5 others above the standard were between 330 and 600/100ml. The two readings below the standard were still 180/100ml and 153/100ml. These results are slightly better than in 1989 but

indicate that Arbuckle is still being impacted by fecal waste. Part of an old story, the Arbuckle Creek watershed has two STP's on it. These are Oak Hill STP and Arbuckle Public Service District in Minden. These two facilities have been reported as having discharged partially treated sewage into Arbuckle Creek during high precipitation runoff events. The Oak Hill plant is over loaded and some lift stations along the collection system overflow frequently even during dry periods (WVDNR 1987-88, p. 32). This year's data seems to indicate that these problems still exist. It may be warranted to implement a 5 time a month sampling schedule of a high flow month and a low flow month in order to substantiate this problem with the WVWRB standard. Continued monitoring will be needed.

14-T, Mann's Creek near the New River confluence. (Figure 15)

Even though Mann's Creek did exceed the standard once with a reading of 470/100ml, the creek still exhibits a high quality as noted in 1990 report. Five of the eight readings fell below 18/100ml and one reading was 113. The reading of 113 was the only reading taken where the flow was described as milky all the rest of the readings were taken when the water was clear. No correlation can be made between the fecal coliform readings and precipitation. Even though this site had one violation, the data seems to indicate that this site could be dropped in lieu of a new tributary in 1992.

15-T, Coal Run near Cunard. (Figure 16)

This site had one violation of 400/100ml. The violation occurred on August 26 after the second highest 48prcp recorded for that site. Four other samples were above 100/100ml. Two of the >100 readings came with 0.0" 48prcp readings while the other two had 1.2" and 0.07" 48prcp. It is obvious that no definite relationship can be established between the rainfall and fecal coliform numbers. The water quality, based on this year's data, seems to indicate that fecal coliforms counts are at acceptable levels. One of two recommendations might be chosen. One is to drop Mann's Creek and add a sample site on the New below the Cunard put in and keep the Coal Run site. The other might be to drop both Coal Run and Mann's and set up a new site on the New at Cunard.

16-T, Keeney's below Winona. (Figure 17)

This is the only site that met or exceeded the standard on every sample occasion. The lowest reading was right at 200/100ml. The two highest were more than of 14,000, one being 14,900/100ml on July 1 and the other 17,000/100ml (the highest) on August 27. The rest of the readings were between 1493/100mL. and 6000/100mL. It is obvious that this stream is being affected by unnatural waste loads. Since much of the creek's watershed is in an isolated forested area, the likely suspect of the fecal waste is the community of Winona and possibly small contributions from Lookout.

Winona is suspected because there are several dwellings that lie right on the bank of Keeney's Creek.

Once again no positive relationships can be established between rainfall and MFC's. It would be good to sample this site 5 times in a month to establish whether this creek does indeed surpass the 200/100mL geometric average set up by the WVWRB. This creek should definitely remain on the sampling list.

17-M, New River at Fayette Station. (Figure 18)

New River at Fayette station exceeded the standard 3 times in 1991, up from one violation in 1990. These were 865/100ml on May 9, 1410/100ml on June 19, and 400/100ml on July 1. One other reading was 120/100ml on May 22, the rest of the readings fell below 63. The pattern of fecal coliform readings at this point on the New River generally followed the high spring count, dropping off as the summer progressed. Of course one reading in the beginning of July does not fit this scheme, but the readings after the 400/100ml reading on July 1, were much lower than the spring readings. The first reading was taken in the large eddy above Fayette Station rapids, the rest of the readings were taken from a point up stream of this eddy on river left. This change was done in an attempt to get closer to the flow of the river.

The high reading on May 9 corresponds with high readings on Keeney's Creek, Wolf Creek and Marr Branch on this same date. Although stages cannot be compared, because Keeney's and Wolf Creek don't have gauges, it would seem that the 1.2" 48prcp was responsible for the excessive fecal coliforms running off the local watersheds. The other two high readings at this site correspond with high readings on Keeney's Creek (May 19, and July 1). Probably Keeney's ability to affect this site is negligible. It is approximately 4 miles upstream, and several other high readings, including 16-T's highest of 17,000/100ml, did not register high readings at 17-M which had a reading of 28. It is possible that the flow with the high readings from Keeney's had not yet reached 17-M. The data for 1991 does not seem to indicate that Keeney's has a definite effect at the bathing area at Fayette Station.

The lowest levels at this site 8/100ml on July 15 and 10/100ml on September 9, occurred when the river stage was reading near 0 or below 0. Although no positive relationship can be proven, it would seem that generally speaking based on 1990, 1991 results would be expected to be lower readings at this site when the stage level is low.

18-T, Wolf Creek at Fayette Station. (Figure 19)

Wolf Creek had 4 violations of the standard, three of these occurred in the spring and one reading occurred in late summer. Outside of this August reading, the stream seemed to follow the

basic spring summer pattern of high counts in spring and lower counts in the summer. No explanation can be given for the high August count, the stream was reported as running low and the 48prcp was 0.0. Wolf Creek has been noted as being influenced by a lift station on the House branch that in time of high inflow and large rain events, allows untreated sewage to run into Wolf Creek.

The first high reading, 268/100ml, on May 9 did correspond with a large rain event, 1.20" 48prcp., the other three readings occurred with low 48 hour rain events. Unfortunately, no real trends can be discovered in the 1991 data except that the readings do not get excessively high. It might be possible that the small rain event readings were showing increased flushing of animal waste. As mentioned in 87-88 report, the Wolf Creek drainage has a lot of pasture land that may contribute to elevated fecal levels. Even though a trace of rainfall is hardly enough to flush a large runoff, it is possible that Beckley, where the reading was derived, received only a trace, while Fayetteville received a little more rain. This, of course, is only one possible explanation.

19-T, Marr Branch below Rivers Inc. campground. (Figure 20)

The appropriate quote for this stream is definitely "**last but not LEAST**". Marr Branch is probably the worst tributary studied in 1991. The close runner ups are Madam's Creek and Keeney's Creek. One fortunate thing for Marr Branch, unlike the others, is that the main problem lies in one point source, that being the Fayetteville STP (WVDNR 1987-88, p. 33). The reason this is fortunate is that the problem, when corrected, will **probably** be cut down in one fell swoop.

Marr Branch exceeded the standard 7 times out of 8, only Keeney's Creek was worse in this regard (8 out of 8). The levels on Marr Branch ran from a high of 60,000/100ml to a low of 140/100ml. One other reading was 32,000/100ml and three others were between 5,000/100ml and 6,000/100ml. Every time the creek was sampled a foul stench emanated from the creek and it usually ran a milky gray to a black sludgy color.

No real trends reveal themselves in the 1991 studies. It was thought that the lower readings in 1991 occurred when the creek was at high stage and the 48prcp was low. Note 19-T on June 3 and 19. This would show that the Fayetteville STP was overloading when we received excessive rainfall. It would also account for greater dilution since the creek would be running at a higher volume with fewer fecals being added because of low rainfall.

CONCLUSION

The results for the 1991 fecal coliform study reveal that the water quality, in relation to animal and human waste, remains about the same as it has been since studies were initiated 1980. Previous studies have pointed to certain tributaries and mainstem sites that are in violation of WVWRB standards for fecal coliform. As earlier mentioned, it must be noted that the number of samples taken each month at the different sites was 2. The WVWRB Standard, in order to be legally applied, requires that 5 samples be taken each month at each site. With this in mind you must remember that any statements about the New River, tributaries, sewage treatment plants, and communities have not been established statistically, these statements serve to reveal general trends that seem to exist at these sites.

This study reveals that the following tributaries are heavily impacted by overloaded STP's and faulty collection systems. The first is Piney Creek, which exceeded 200/100ml 4 times out of 8. This creek is probably affected by Beckley and North Beckley STP's. Dunloup exceeded the standard 7 times out of 8, and is probably affected by Mount Hope STP, White Oak PSD and the community of Kilsyth. Arbuckle Creek, affected by Oak Hill STP and Arbuckle PSD, exceeded the standard 6 of 8 samples. Wolf Creek exceeded the standard 50% of the time and is possibly impacted by the overloaded lift station for the Fayetteville STP that is located on the House Branch of Wolf Creek. Finally, the worst of all, Marr Branch, which exceeded the standard 7 of 8 samples, is probably affected by the Fayetteville STP, which although it was noted that it functions up to standards, the combined system brings in 3 times the volume the plant was built to bear (WVDNR 1987-88, p. 33). High readings for Wolf Creek also could be related to the large area in its watershed used as pasture land.

Of the above creeks, Piney Creek, Dunloup and Marr Branch probably present the highest public health risks. The mouths of both Piney and Dunloup creeks are used as public access to the New River. Commercial companies and especially private boaters use these sites to gain access to the New. Marr Branch presents a risk as well. The creek flows through the middle of the Rivers Inc., rafting company and campground. The public is assaulted by the stench and visual degradation of this creek, as well as being exposed to quite high fecal coliform populations.

Wolf Creek can be considered a lesser, but known threat, to public health. This creek flows into a large eddy on the New, just above Fayette Station Rapids. This large eddy is a popular swimming and wading spot. This high public contact makes this creek a fairly high public risk site.

Arbuckle Creek is a lesser threat because much of it runs through uninhabited forest. Sites along Minden and Mary Draper Ingles Trail access present possible points of public contact. As these areas develop, public risk will increase.

Keeney's Creek and Madam's Creek do not have STP's in their watersheds and yet these two had the highest readings for any site except 3-M. It is quite possible that these sites are affected by the local communities in their watershed. Keeney's Creek is probably affected by Winona and possibly the town of Lookout. Madam's Creek is probably affected by sewage from local residences near the creek. The 87-88 report stated that livestock grazing at the upper end of the creek might be responsible, in part, for the high fecal coliforms readings.

The 6 remaining tributaries seem to be in good condition, with low fecal coliforms readings throughout the sample season. These creeks are Lick Creek, T-5, Meadow Creek, 6-T, Laurel Creek at Quinnimont, 7-T, Slaters Creek, Mann's Creek and Coal Run. All of these creeks, except for Laurel Creek at Quinnimont with 0, had one sample reading in excess of the standard. Although no positive relationships can be stated as fact, these creeks seem to be in above average condition as far as fecal coliform is concerned.

Of the mainstem sites, only two had more than one violation of the standard. New River at Hinton Visitor Center, Prince, Slater's Creek, and Thurmond had only one reading over the standard. New River at Sandstone's highest reading was 98/100ml. This site continues to bear the best record for Mainstem sites.

New River at Fayette Station had 3 readings over the standard. This presents a bit of a public risk problem because this site is just above the large eddy above Fayette Station Rapids. This eddy is also impacted by upstream flow from Wolf Creek especially during low flow periods.

The New River at Hinton STP was again the worst site sampled on the New River. Fortunately, after July 8 the low fecal coliform levels reflect that the old STP was shut down and the new STP came on line. In 1992 this needs to be dropped in lieu of a new site downstream of the New STP. A second site a mile or so down stream also might be set up to measure the amount of mixing and dilution that occurs downstream of the New STP.

FIGURES EXPLANATION

The following figures represent the fecal coliform data for the 1991 NERI fecal coliform study. It should be noted that each chart should be looked at separately. The vertical "y" axis changes from chart to chart, so the figures cannot be compared directly. Also note that the stream level unit is in tenths of feet. The rainfall is the amount of precipitation that fell within a 48 hour period before the date listed.

NOTE: The 7/25 reading on Figure 4 is not to scale. The reading is 224,000/100ml, the scale for the bar on the graph is 22,400.

Figure 2. Fecal Coliform Data for New River at Hinton Visitor Center

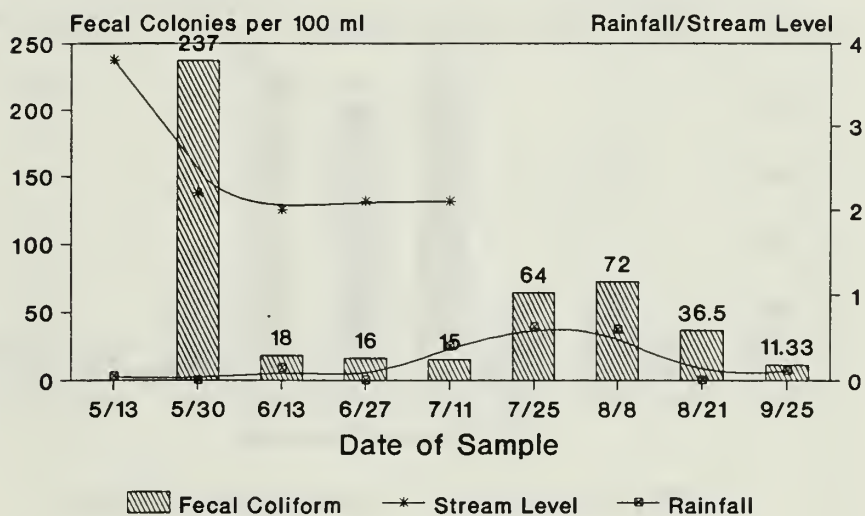


Figure 3. Fecal Coliform Data for Madam Creek

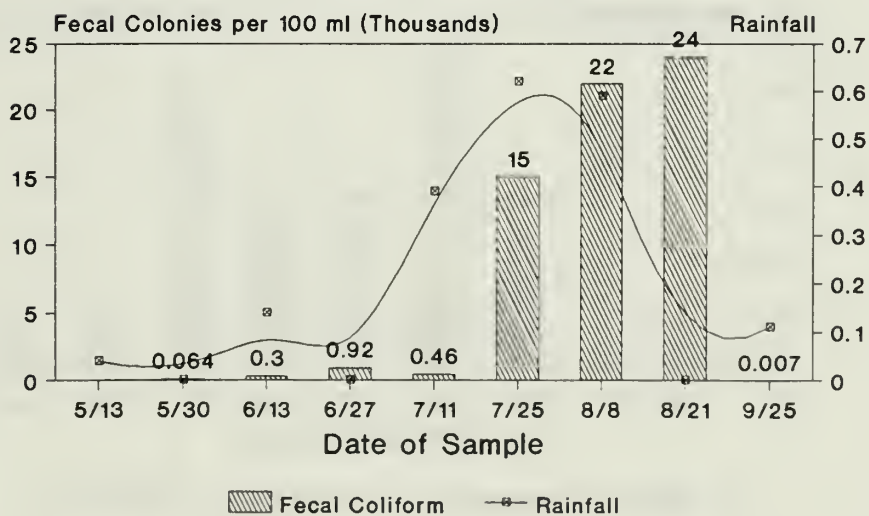


Figure 4. Fecal Coliform Data for New River at Hinton STP

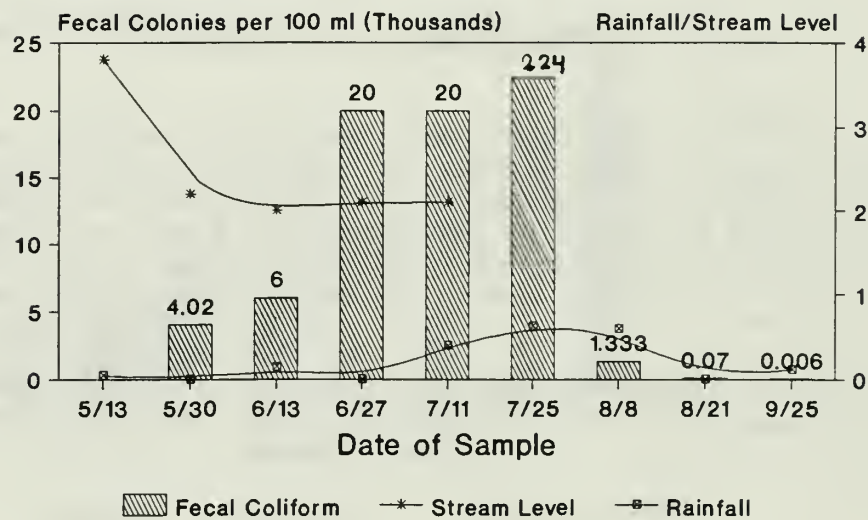


Figure 5. Fecal Coliform Data for New River at Sandstone Falls

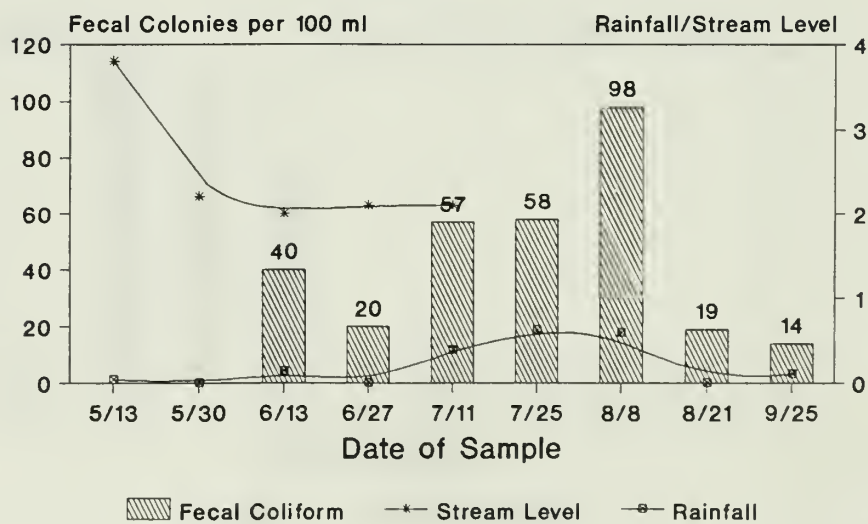


Figure 6. Fecal Coliform Data for Lick Creek

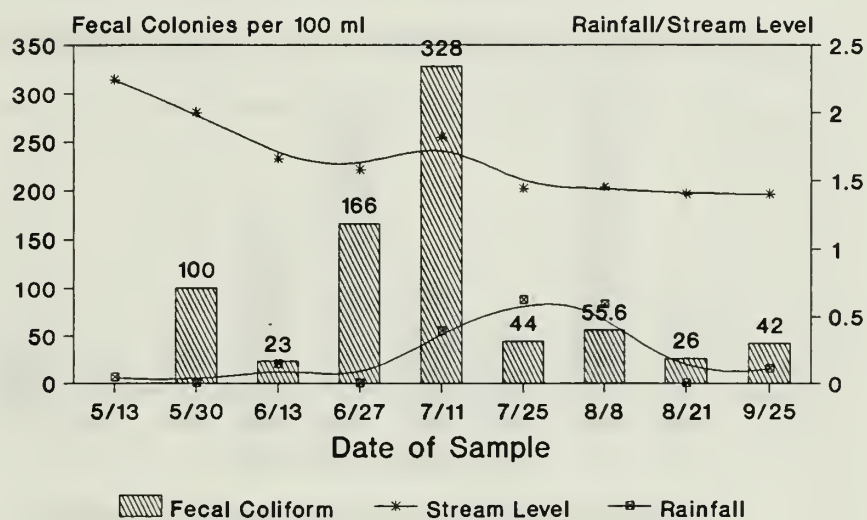


Figure 7. Fecal Coliform Data for Meadow Creek

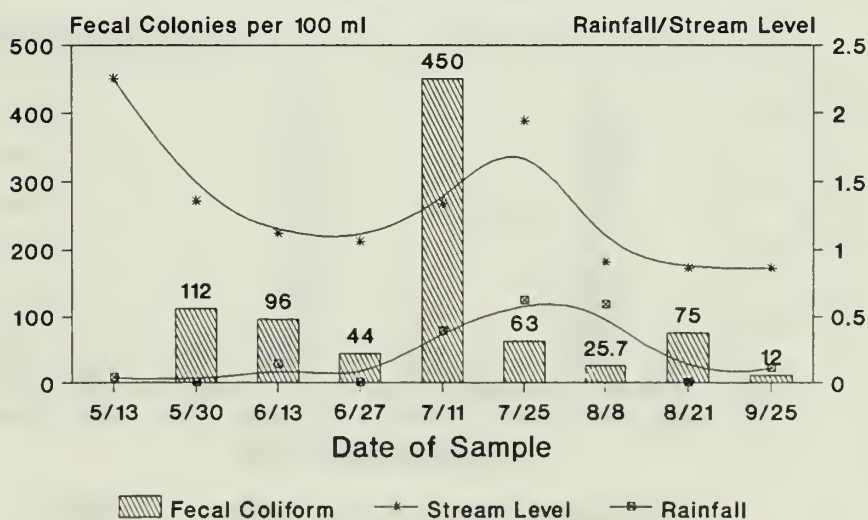


Figure 8. Fecal Coliform Data for
Laurel Creek @ Quinnimont

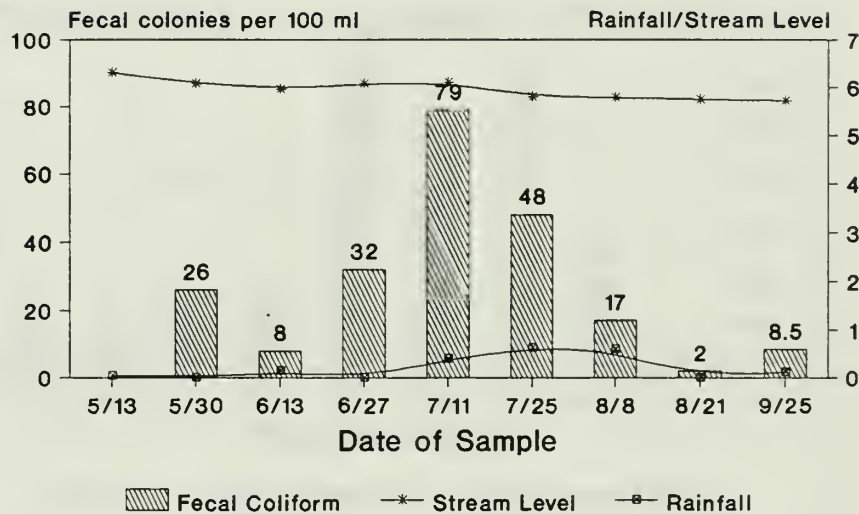


Figure 9. Fecal Coliform Data for
New River @ Prince

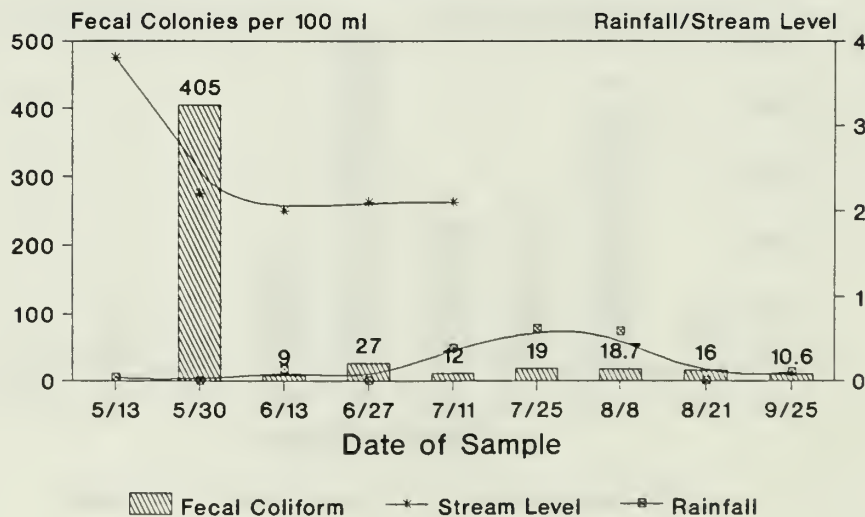


Figure 10. Fecal Coliform Data for Piney Creek

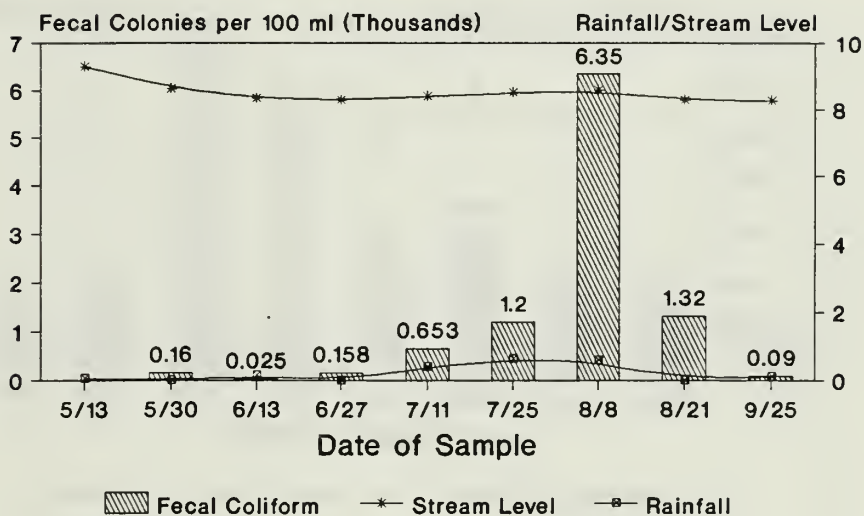


Figure 11. Fecal Coliform Data for Slater's Creek

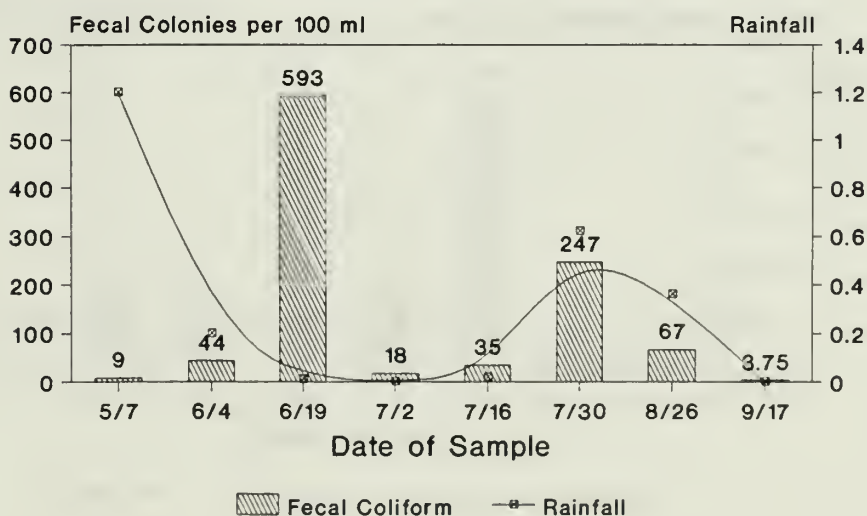


Figure 12. Fecal Coliform Data for Dunloup Creek

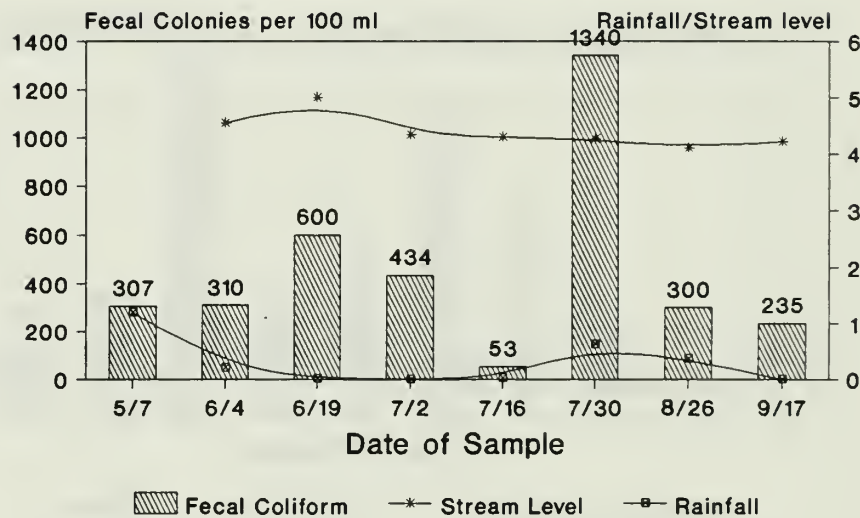


Figure 13. Fecal Coliform Data for New River @ Thurmond

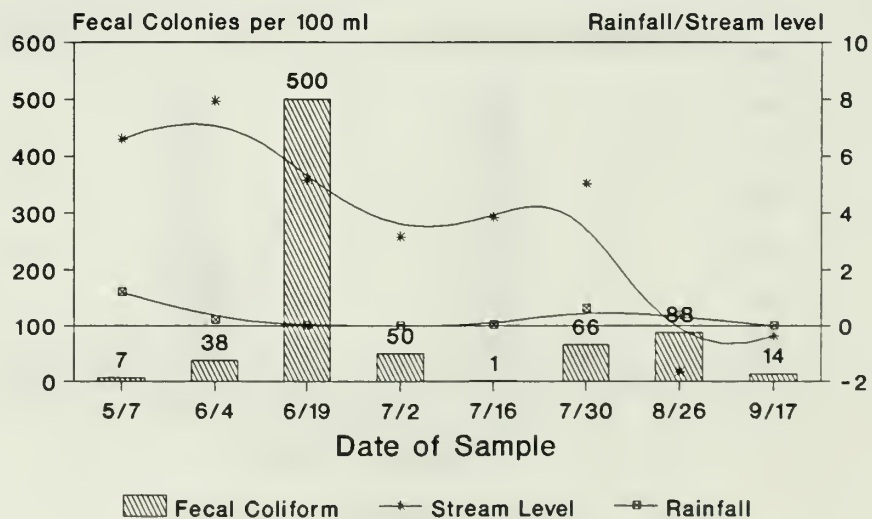


Figure 14. Fecal Coliform Data for Arbuckle Creek

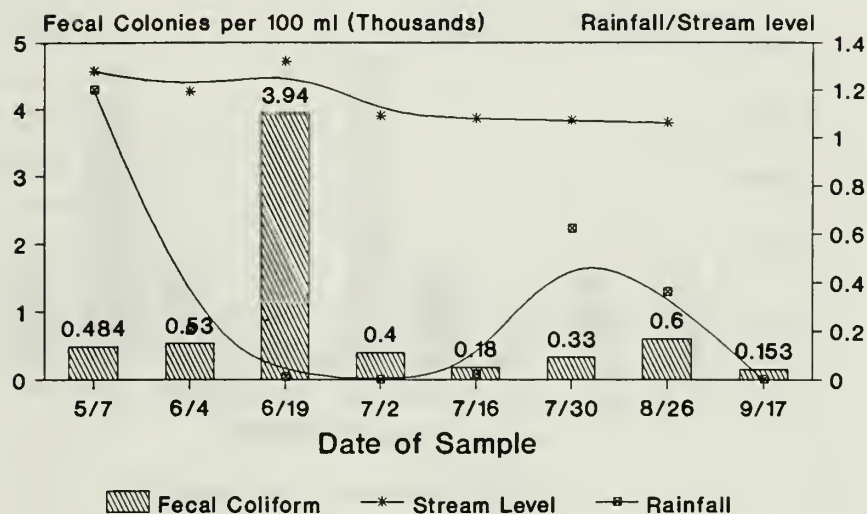


Figure 15. Fecal Coliform Data for Mann's Creek

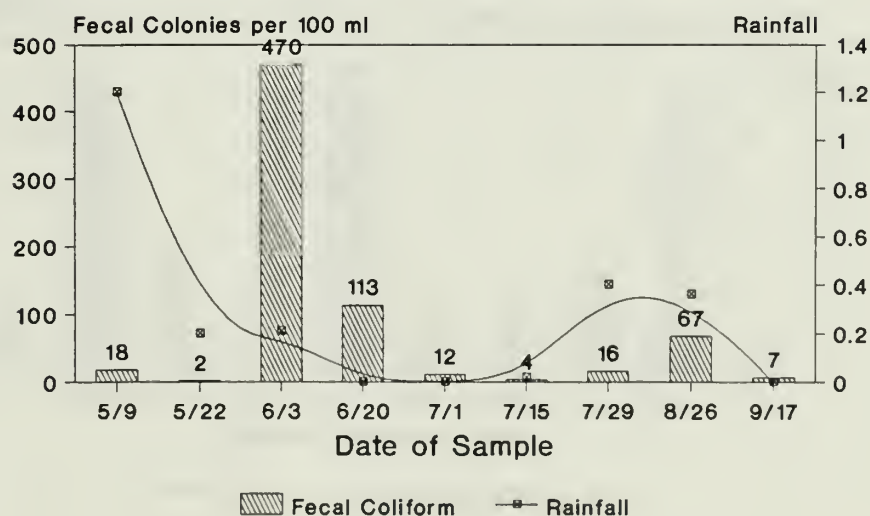


Figure 16. Fecal Coliform Data for Coal Run

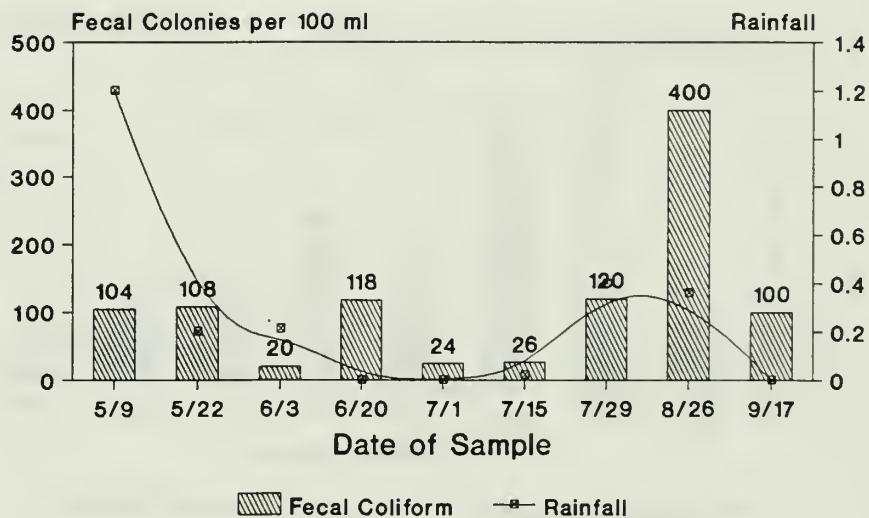


Figure 17. Fecal Coliform Data for Keeney's Creek

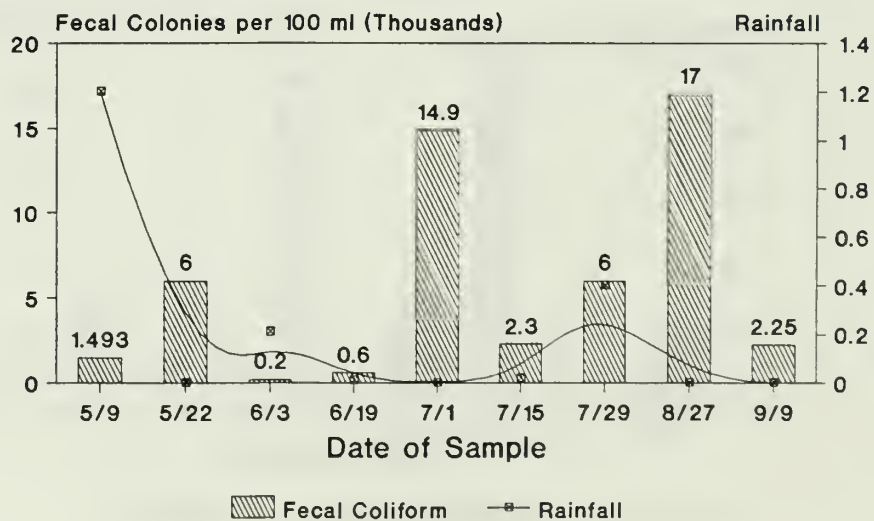


Figure 18. Fecal Coliform Data for
New River @ Fayette Station

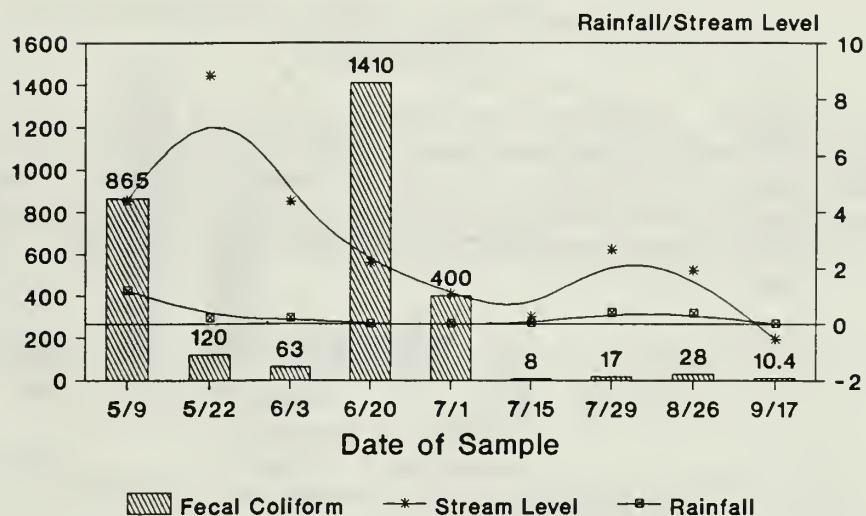


Figure 19. Fecal Coliform Data for
Wolf Creek

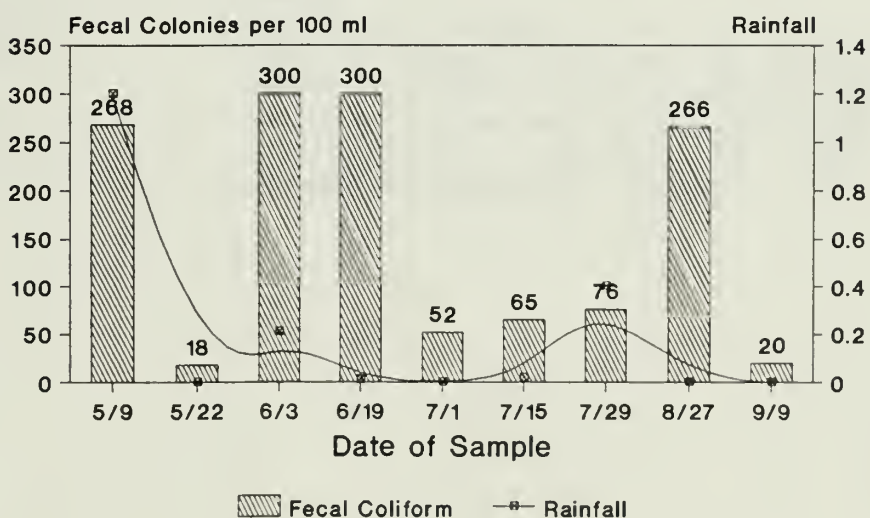
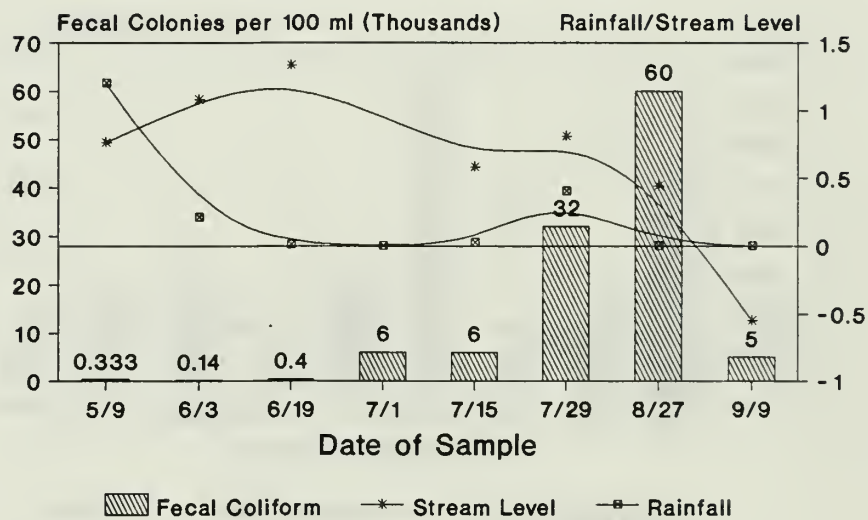


Figure 20. Fecal Coliform Data for Marr Branch



APPENDICES

This section contains the appendices referred to in the paper. In Appendix - 11 the 0.0 values for dissolved oxygen are not accurate. The data base program printed zeros in place of blank spaces. The 0.0 represent periods when the DO meter was being serviced. The following is a key to the abbreviations used in Appendix - 11.

SITE_NO	Site Number
SITE_NAME	Site Name
DATE	Date
TIME	Time
WATER_TEMP	Water Temperature (in celsius)
F_100ML	Fecal coliform colonies per 100 mls of sample
AIR_TEMP	Air Temperature (in celsius)
PH	pH
STREAM_LVL	Stream level
WATER_COND	Water condition
INCUBATION	The amount of time the fecal coliform colonies were incubated in the hot water bath
DISS_OXYGN	Dissolved oxygen
DILUTIONS	The dilutions used to get the accepted fecal coliform colony reading (20 - 60)
WEATHER	Weather (referred to in appendix - 2)
PRECIP_48	Precipitation in the 48 hour period preceding the date listed

Appendix - 1: This is an example sheet of the data collected when each site was sampled. Conductivity units are micro ohms. The top numbers in the dilution column are the milliliters of sample used and the numbers below them are the fecal coliform colony count.

SAMPLE SITE	DATE	SAMPLE TIME	WATER TEMP	AIR TEMP	pH	STAGE LEVEL	WATER COND	DO	WEATHER	CONDUCTIVITY	DILUTIONS		FECALS /100ML	COMMENTS
9. PINEY CREEK @ McCREERY	8/21/91	8:20	20°C	15°C	7.0	8.28	L, M, C	8.4	overcast	358	10 125	5 66	Est. 1320	
8. NEW RIVER @ PRINCE	8/21/91	8:40	26°C	18°C	7.9	1.9	L, M, C	7.2	overcast	150	100 12	150 24	16/100	
7. LAUREL CREEK @ QUINNMT	8/21/91	9:00	19°C	18°C	7.7	5.75	L, M, C	8.8	overcast drizzle	145	100 2	50 2	Est. 2	
6. MEADOW CREEK	8/21/91	10:00	21°C	19°C	7.9	0.86	L, M, C	7.8	overcast	225	30 11	20 15	Est. 75	
5. LICK CREEK	8/21/91	10:15	20°C	22°C	7.7	1.40	L, S, C	5.7	Partly cloudy	400	35 26	25 12	26	
4. NEW RIVER @ SANDSTONE	8/21/91	10:50	24.5°C	24°C	8.7	1.90	L, M, C	6.4	Sunny slightly overcast	140	.2 0	10 7	Est. 70	Hinton STP no longer on Line (old STP)
3. NEW RIVER @ HINT STP	8/21/91	12:30	25°C	28°C	8.9	1.90	L, M, C	6.9	Sunny Part cloudy	150	100 19	50 4	Est. 19	
2. MADAM CREEK	8/21/91	1:00	22°C	27°C	8.1	—	L, S, C	4.7	Sunny slightly over	280	1 193	.5 120	Est. 24,000	
1. NEW RIVER @ HINTN VC	8/21/91	11:15	26°C	22°C	8.0	1.90	L, M, C	5.8	overcast	155	150 47	100 26	Est. 36.5	
									Pre-control		0	0		
									Post-control		0	0		
HINTON GAGE	1.9	OTHER OBSERVATIONS AND COMMENTS:												
PRECIP W/IN 48 HOURS	0.0													

TIME IN: 5:20 pm
TIME OUT: 4:15 pm

WEATHER CODES

I. CLOUD AMOUNT

CLR CLEAR: LESS THAN 1% SKY COVER

SCT SCATTERED: 1% TO 50% SKY COVER

BKN BROKEN: 60% TO 90% SKY COVER

OVC OVERCAST: MORE THAN 90% SKY COVER

- THIN (WHEN PREFIXED TO THE ABOVE SYMBOLS)

-X PARTIAL OBSCURATION: 1% TO LESS THAN 10% SKY HIDDEN BY PRECIPITATION OR OBSTRUCTION TO VISION

X OBSCURATION: 10% SKY HIDDEN BY PRECIPITATION OR OBSTRUCTION TO VISION

II. PHYSICAL WEATHER:

A. WEATHER AND OBSTRUCTION TO VISION SYMBOLS

A HAIL

BS BLOWING SNOW

D DUST

F FOG

GF GROUND FOG

H HAZE

K SMOKE

L DRIZZLE

R RAIN

RW RAIN SHOWERS

S SNOW

SW SNOW SHOWERS

T THUNDERSTORMS

T+ SEVERE THUNDERSTORMS

ZL FREEZING DRIZZLE

ZR FREEZING RAIN

B. PRECIPITATION INTENSITIES

(-) LIGHT

(NO SIGN) MODERATE

(+) HEAVY

Stream Conditions

First letter
(volume):

L = low
N = normal
H = high

Second letter(s)
(velocity):

SL = slow
M = moderate
SW = swift

Third letter(s)
(opacity):

C = clear
MI = milky
MR = murky

Appendix - 3: Phone numbers used to determine New River stage levels at Thurmond and Hinton.

GAUGES

Following is a list of non-battery operated gauges for several area rivers. The WVWA answering service will carry levels of selected rivers when they are at paddling levels.

<u>PHONE</u>	<u>RIVERS</u>	<u>COMMENTS</u>
465-0493	NEW (THURMOND)	Beeper gauge, 24-hour continuous update.
466-0156	NEW (Bluestone Dam release)	Updated 8:00 AM each day.
529-5127	NEW & GAULEY Watersheds	Updated 10:00 AM each day.
	(Stage, flow & 24-hour change on all gauging stations on Bluestone, Greenbrier, Cranberry, Elk & Meadow, plus New & Gauley.)	

GAUGE CORRELATIONS FOR NEW:

<u>Fayette Sta. (visual)</u>	<u>Hinton</u>	<u>Thurmond</u>	<u>Flow. cfs</u>
-2	0.45	1.8	1070
-1	0.6	2.8	1700
0	0.8	3.4	2440
1	1.0	4.4	3350
2	1.2	5.1	4440
3	1.4	5.7	5820
4	1.7	6.5	7550
5	2.0	7.2	9550
6	2.4	8.0	11400
7	2.7	8.7	14100
8	3.0	9.5	17200
9	3.4	10.3	20200
10	3.7	11.2	23800

Appendix - 4 Table of Fecal Coliform Values for the New River Gorge National River Fecal Coliform Study, April-September, 1987-1988. Stage Level and 48 Hour Precipitation are listed with corresponding dates and sample location.

33

SITE # & LOCATION	DATE	FECAL COLIFORM PER 100mL. OF SAMPLE	STREAM LEVEL IN 1/10 OF FEET	48 HOUR PRECIPITATION
1-M, NEW RIVER @ HINTON VC	05/13/91		3.80	0.04
	05/30/91	* 237	2.20	0.00
	06/13/91	18	2.00	0.14
	06/27/91	16	2.10	0.00
	07/11/91	15	2.10	0.39
	07/25/91	64		0.62
	08/08/91	72		0.59
	08/21/91	e 36.5		0.00
	09/25/91	e 11.33		0.11
2-T, MADAM CREEK	05/13/91			0.04
	05/30/91	64		0.00
	06/13/91	* e 300 >		0.14
	06/27/91	* 920		0.00
	07/11/91	* 460		0.39
	07/25/91	* 15000		0.62
	08/08/91	* e 22000		0.59
	08/21/91	* e 24000		0.00
	09/25/91	e 7		0.11
3-1, NEW RIVER @ HINTON STP	05/13/91		3.80	0.04
	05/30/91	* 4020	2.20	0.00
	06/13/91	* e 6000 >	2.00	0.14
	06/27/91	* 20000	2.10	0.00
	07/11/91	* e 20000 >	2.10	0.39
	07/25/91	* 224000		0.62
	08/08/91	* e 1333		0.59
	08/21/91	e 70		0.00
	09/25/91	e 6		0.11

The FECAL COLIFORM PER 100mL. OF SAMPLE means the number of fecal coliform colonies counted on the membrane filter and then adjusted for 100 milliliters of sample.

> Means that the value is estimated as being greater than the one displayed.

< Means that the value is estimated as being fewer than the one displayed.

* Indicates values greater than 200 counts per 100mL.

e Indicates that the value is estimated.

SITE # & LOCATION	DATE	FECAL COLIFORM PER 100mL. OF SAMPLE	STREAM LEVEL IN 1/10 OF FEET	48 HOUR PRECIPITATION
4-M, NEW RIVER @ SANDSTONE	05/13/91		3.80	0.04
	05/30/91		2.20	0.00
	06/13/91	40	2.00	0.14
	06/27/91	20	2.10	0.00
	07/11/91	57	2.10	0.39
	07/25/91	58		0.62
	08/08/91	98		0.59
	08/21/91	e 19		0.00
	09/25/91	e 14		0.11
5-T, LICK CREEK	05/13/91		2.24	0.04
	05/30/91	100	2.00	0.00
	06/13/91	23	1.66	0.14
	06/27/91	166	1.58	0.00
	07/11/91	* 328	1.82	0.39
	07/25/91	44	1.44	0.62
	08/08/91	e 55.6	1.45	0.59
	08/21/91	e 26	1.40	0.00
	09/25/91	e 42	1.40	0.11
6-T, MEADOW CREEK	05/13/91		2.25	0.04
	05/30/91	112	1.36	0.00
	06/13/91	96	1.12	0.14
	06/27/91	44	1.06	0.00
	07/11/91	* 450	1.34	0.39
	07/25/91	63	1.94	0.62
	08/08/91	e 25.7	.910	0.59
	08/21/91	e 75	0.86	0.00
	09/25/91	e 12	0.86	0.11

The FECAL COLIFORM PER 100mL. OF SAMPLE means the number of fecal coliform colonies counted on the membrane filter and then adjusted for 100 milliliters of sample.

> Means that the value is estimated as being greater than the one displayed.

< Means that the value is estimated as being fewer than the one displayed.

* Indicates values greater than 200 counts per 100mL.

e Indicates that the value is estimated.

Appendix - 6 Table of Fecal Coliform Values for the New River Gorge National River Fecal Coliform Study, April-September, 1987-1988. Stage Level and 48 Hour Precipitation are listed with corresponding dates and sample location.

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<u>SITE # & LOCATION</u>	<u>DATE</u>	<u>FECAL COLIFORM PER 100mL. OF SAMPLE</u>	<u>STREAM LEVEL IN 1/10 OF FEET</u>	<u>48 HOUR PRECIPITATION</u>
7-T, LAUREL CREEK @ QUINNIMONT	05/13/91		6.30	0.04
	05/30/91	26	6.08	0.00
	06/13/91	8	5.95	0.14
	06/27/91	32	6.08	0.00
	07/11/91	79	6.10	0.39
	07/25/91	48	5.80	0.62
	08/08/91	e 17	5.78	0.59
	08/21/91	e 2	5.75	0.00
	09/25/91	e 8.5	5.72	0.11
8-M, NEW RIVER PRINCE	05/13/91			0.04
	05/30/91	* 405	3.80	0.00
	06/13/91	9	2.20	0.14
	06/27/91	27	2.00	0.00
	07/11/91	12	2.10	0.39
	07/25/91	19	2.10	0.62
	08/08/91	e 18.7		0.59
	08/21/91	16		0.00
	09/25/91	e 10.6		0.11
9-I, PINEY CREEK	05/13/91		9.30	0.04
	05/30/91	160	8.62	0.00
	06/13/91	25	8.34	0.14
	06/27/91	158	8.28	0.00
	07/11/91	* 653	8.40	0.39
	07/25/91	* 1200	8.50	0.62
	08/08/91	* 6350	8.58	0.59
	08/21/91	* e 1320	8.28	0.00
	09/25/91	90	8.26	0.11

The FECAL COLIFORM PER 100mL. OF SAMPLE means the number of fecal coliform colonies counted on the membrane filter and then adjusted for 100 milliliters of sample.

> Means that the value is estimated as being greater than the one displayed.

< Means that the value is estimated as being fewer than the one displayed.

* Indicates values greater than 200 counts per 100mL.

e Indicates that the value is estimated.

SITE # & LOCATION	DATE	FECAL COLIFORM PER 100mL. OF SAMPLE	STREAM LEVEL IN 1/10 OF FEET	48 HOUR PRECIPITATION
10-T, SLATER'S CREEK	05/07/91	9		1.20
	06/04/91	44		0.20
	06/19/91	* e 593		TRACE
	07/02/91	18		0.00
	07/16/91	e 35		0.02
	07/30/91	* 247		0.62
	08/26/91	e 67		0.36
	09/17/91	e 4(3.75)		0.00
11-T, DUNLOUP CREEK	05/07/91	* 307		1.20
	06/04/91	* 310	4.54	0.20
	06/19/91	* 600 >	5.00	TRACE
	07/02/91	* 434	4.34	0.00
	07/16/91	e 53	4.29	0.02
	07/30/91	* e 1340 >	4.26	0.62
	08/26/91	* e 300	4.10	0.36
	09/17/91	* 235	4.21	0.00
12-M, NEW RIVER @ THURMOND	05/07/91	7	6.58	1.20
	06/04/91	38	7.90	0.20
	06/19/91	* e 500	5.16	TRACE
	07/02/91	50	3.17	0.00
	07/16/91	e 1 <	3.85	0.02
	07/30/91	66	5.03	0.62
	08/26/91	e 88	1.65-	0.36
	09/17/91	e 14	0.35-	0.00

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Table of Fecal Coliform Values for the New River Gorge National River Fecal Coliform Study, April-September, 1987-1988. Stage Level and 48 Hour Precipitation are listed with corresponding dates and sample location.

SITE # & LOCATION	DATE		FECAL COLIFORM PER 100mL. OF SAMPLE	STREAM LEVEL IN 1/10 OF FEET	48 HOUR PRECIPITATION
13-T, ARBUCKLE CREEK	05/07/91	*	484	1.28	1.20
	06/04/91	*	530	1.19	0.20
	06/19/91	*	e 3940	1.32	TRACE
	07/02/91	*	400	1.09	0.00
	07/16/91		e 180	1.08	0.02
	07/30/91	*	330	1.07	0.62
	08/26/91	*	e 600	1.06	0.36
	09/17/91		153	N/A	0.00
14-T, MANN'S CREEK	05/09/91		18		1.20
	05/22/91		e 2		0.00
	06/03/91	*	e 470		TRACE, 0.20
	06/20/91		113		0.00
	07/01/91		12		0.00
	07/15/91		e 4		0.02
	07/29/91		e 16		0.40
	08/26/91		e 67		0.36
	09/17/91		e 7		0.00
15-T, COAL CREEK	05/09/91		104		1.20
	05/22/91		108		0.00
	06/03/91		20		TRACE, 0.20
	06/20/91		118		0.00
	07/01/91		24		0.00
	07/15/91		e 26		0.02
	07/29/91		e 120	>	0.40
	08/26/91	*	e 400		0.36
	09/17/91		100		0.00

The FECAL COLIFORM PER 100mL. OF SAMPLE means the number of fecal coliform colonies counted on the membrane filter and then adjusted for 100 milliliters of sample.

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SITE # & LOCATION	DATE	FECAL COLIFORM PER 100mL. OF SAMPLE	STREAM LEVEL IN 1/10 OF FEET	48 HOUR PRECIPITATION
16-T, KENNEY'S CREEK	05/09/91	* 1493		1.20
	05/22/91	* e 6000		0.00
	06/03/91	* 200		TRACE, 0.20
	06/19/91	* e 600 >		TRACE
	07/01/91	* 14900		0.00
	07/15/91	* e 2300		0.02
	07/29/91	* e 6000		0.40
	08/27/91	* e 17000		0.00
	09/09/91	* e 2250		0.00
17-M, NEW RIVER @ FAYETTE STATION	05/09/91	* 865	4.41	1.20
	05/22/91	e 120	8.83	0.00
	06/03/91	63	4.36	TRACE, 0.20
	06/19/91	* e 1410	2.19	TRACE
	07/01/91	* 400	1.08	0.00
	07/15/91	e 8	0.264	0.02
	07/29/91	e 17	2.65	0.40
	08/27/91	e 28	1.90	0.00
	09/09/91	e 10.4	0.55-	0.00
18-T, WOLF CREEK	05/09/91	* 268		1.20
	05/22/91	e 18		0.00
	06/03/91	* 300		TRACE, 0.20
	06/19/91	* e 300 >		TRACE
	07/01/91	52		0.00
	07/15/91	e 65		0.02
	07/29/91	e 76		0.40
	08/27/91	* e 266		0.00
	09/09/91	e 20		0.00

The FECAL COLIFORM PER 100mL. OF SAMPLE means the number of fecal coliform colonies counted on the membrane filter and then adjusted for 100 milliliters of sample.

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Appendix - 10 Table of Fecal Coliform Values for the New River Gorge National River Fecal Coliform Study, April-September, 1987-1988. Stage Level and 48 Hour Precipitation are listed with corresponding dates and sample location.

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<u>SITE # & LOCATION</u>	<u>DATE</u>	<u>FECAL COLIFORM PER 100mL. OF SAMPLE</u>	<u>STREAM LEVEL IN 1/10 OF FEET</u>	<u>48 HOUR PRECIPITATION</u>
19-T, MARR BRANCH	05/09/91	* 333	0.76	1.20
	06/03/91	140	1.08	TRACE, 0.20
	06/19/91	* e 400 >	1.33	TRACE
	07/01/91	* e 6000		0.00
	07/15/91	* e 6000	0.58	0.02
	07/29/91	* e 32000	0.81	0.40
	08/27/91	* e 60000	0.44	0.00
	09/09/91	* e 5000	0.55-	0.00
		328316		

The FECAL COLIFORM PER 100mL. OF SAMPLE means the number of fecal coliform colonies counted on the membrane filter and then adjusted for 100 milliliters of sample.

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Appendix - 11: Raw data for the NERI Fecal Coliform Study, April - September, 1991.

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STATION NO	SITE NAME	DATE	TIME	WATER TEMP	FC/100ML	AIR TEMP	P8	STREAM LVL	WATER COLOR	INCUBATION	DISS. OXYGEN	DILUTIONS	WEATHER
N	NEW RIVER @ HINTON VC	05/13/91	1:15	18.0	0	26	9.40		TURBID	23:00	0.00	125ML:100ML:	SUNNY.
N	NEW RIVER @ HINTON VC	05/30/91	12:35	20.0	237	0	7.70 3.80		TURBID	23:00	8.40	20ML:30ML:	SGT. SUNNY
N	NEW RIVER @ HINTON VC	06/13/91	12:10	25.0	18	0	8.50 2.20		LOW, SLOW, MURKY	23:00	0.00	30ML:50ML:	SUNNY, SCT-
N	NEW RIVER @ HINTON VC	06/27/91	12:22	0.0	16	0	8.10 2.00		NORMAL, MODERATE, MILEY	22:50	0.00	50ML:3.100ML:1E	CLEAR, B-
N	NEW RIVER @ HINTON VC	07/11/91	01:00	25.0	15	28	7.80 2.10		NORMAL, MODERATE, MILEY	22:45	0.00	100ML:15.50ML:5	BLK
N	NEW RIVER @ HINTON VC	07/25/91	01:37	30.0	64	28	8.10 2.10		LOW, MODERATE, CLEAR	21:40	7.20	150ML:98.100ML:64	OVERCAST
N	NEW RIVER @ HINTON VC	08/08/91	1:05	28.0	72	28	8.10		NORMAL, SLOW, CLEAR	23:30	7.30	50ML:36.100ML:65	SCT. B-
N	NEW RIVER @ HINTON VC	08/21/91	11:15	26.0	36	22	8.00		LOW, MODERATE, CLEAR	22:55	5.80	150ML:47.100ML:28	BLK.
N	NEW RIVER @ HINTON VC	09/25/91	12:43	22.0	11	20	7.80		LOW, SLOW, MILEY	22:30	8.20	100ML:4.150ML:17	OVC.
N	NADAN CREEK	05/13/91	1:00	16.0	0	25	7.40		TURBID	23:00	0.00	20ML:10ML:	SUNNY.
N	NADAN CREEK	05/30/91	12:15	21.0	64	0	8.20		CLEAR	23:00	8.40	2ML:3ML:	SGT. SUNNY
N	NADAN CREEK	06/13/91	11:50	24.0	300	0	8.50		NORMAL, MODERATE, CLEAR	23:00	0.00	20ML:30ML:	SUNNY, SCT-
N	NADAN CREEK	06/27/91	12:10	0.0	920	0	8.60		LOW, SLOW, CLEAR	22:50	0.00	1ML:92.2ML:72	CLEAR, B-
N	NADAN CREEK	07/11/91	12:49	26.0	460	29	7.90		NORMAL, MODERATE, CLEAR	22:45	0.00	1.0ML:48.0.5ML:22	BLK
N	NADAN CREEK	07/25/91	12:34	24.5	15000	30	7.20		LOW, SLOW, CLEAR	21:40	7.20	1ML:TWTC, 0.5ML:75	OVERCAST
N	NADAN CREEK	08/08/91	11:50	25.0	22000	32	7.00		NORMAL, SLOW, MURKY	23:30	7.00	1ML:22.3ML:65	CLR.
N	NADAN CREEK	08/21/91	1:00	22.0	24000	27	6.10		LOW, SLOW, CLEAR	22:55	4.70	1ML:193.5ML:120	SUNNY.
N	NADAN CREEK	09/25/91	11:35	18.0	7	20	7.40		LOW, SLOW, MILEY	22:30	5.00	1ML:1.3ML:4	OVC.
N	NEW RIVER @ HINTON SEWAGE TP	05/13/91	12:15	18.0	0	25	8.20		MILEY	23:00	0.00	30ML:20ML:	SUNNY.
N	NEW RIVER @ HINTON SEWAGE TP	05/30/91	11:15	24.0	4920	0	7.90 3.80		TURBID	23:00	0.00	2ML:3ML:	CLOUDY, RAIN
N	NEW RIVER @ HINTON SEWAGE TP	06/13/91	01:18	27.5	6000	0	6.40 2.20		LOW, MODERATE, MURKY	23:00	0.00	1ML:2ML:	SUNNY, SCT-
N	NEW RIVER @ HINTON SEWAGE TP	06/27/91	10:53	24.5	20000	0	7.90 2.00		NORMAL, MODERATE, MILEY	22:50	0.00	1ML:200 2ML:TWTC	SCATTERED, RAZE-
N	NEW RIVER @ HINTON SEWAGE TP	07/11/91	01:35	29.5	20000	30	0.00 2.10		NORMAL, MODERATE, MILEY	22:45	0.00	3ML:TWTC, 7ML:TWTC	
N	NEW RIVER @ HINTON SEWAGE TP	07/25/91	12:08	29.0	224,000	26	7.70 2.10		LOW, MODERATE, CLEAR	21:40	5.40	0.2ML:382.0.1ML:224	OVERCAST
N	NEW RIVER @ HINTON SEWAGE TP	08/08/91	11:29	27.0	1333	29	8.20		NORMAL, MODERATE, CLEAR	23:30	7.60	3ML:4.5ML:4	OVC. B-
N	NEW RIVER @ HINTON SEWAGE TP	08/21/91	10:50	24.5	70	24	8.70		LOW, MODERATE, CLEAR	22:55	6.40	2ML:0.10ML:7	SUNNY.
N	NEW RIVER @ HINTON SEWAGE TP	09/25/91	11:15	20.0	6	19	6.20		LOW, MODERATE, CLEAR	22:30	0.00	50ML:5.100ML:6	OVC.
N	NEW RIVER @ SANDSTONE	05/13/91	12:45	20.0	0	25	6.20		MILEY	23:00	6.60	70ML:50ML:	SUNNY.
N	NEW RIVER @ SANDSTONE	05/30/91	11:35	16.0	0	0	7.70 3.80		TURBID	23:00	9.80	20ML:30ML:	CLOUDY, RAIN
N	NEW RIVER @ SANDSTONE	06/13/91	11:10	25.0	40	0	9.00 2.20		NORMAL, MODERATE, MURKY	23:00	0.00	20ML:30ML:	SUNNY, SCT-
N	NEW RIVER @ SANDSTONE	06/27/91	11:38	24.0	20	0	8.30 2.00		NORMAL, MODERATE, MILEY	22:50	0.00	50ML:100ML:	CLEAR, B-
N	NEW RIVER @ SANDSTONE	07/11/91	12:17	26.5	57	26	8.40 2.10		NORMAL, MODERATE, MILEY	22:45	0.00	100ML:50.50ML:32	BLK
N	NEW RIVER @ SANDSTONE	07/25/91	01:04	27.0	56	29	8.40 2.10		LOW, MODERATE, MILEY	21:40	7.60	100ML:51.50ML:32	OVERCAST
N	NEW RIVER @ SANDSTONE	08/06/91	12:23	30.0	96	33	9.00		NORMAL, MODERATE, MILEY	23:30	9.20	50ML:49.100ML:90	BLK. B-
N	NEW RIVER @ SANDSTONE	08/21/91	12:30	25.0	19	26	6.90		LOW, MODERATE, CLEAR	22:55	6.90	100ML:19.50ML:4	SUNNY.
N	NEW RIVER @ SANDSTONE	09/25/91	12:16	21.0	14	20	6.30		LOW, SLOW, MILEY	22:30	0.00	35ML:3.50ML:7	OVC.
N	LICK CREEK	05/13/91	11:20	20.0	0	24	8.00 2.24		TURBID	23:00	0.00	30ML:20ML:	SUNNY.
N	LICK CREEK	05/30/91	10:05	21.0	100	0	8.00 2.00		MILEY	23:00	8.40	5ML:10ML:	SUNNY, RAZE
N	LICK CREEK	06/13/91	10:14	21.5	23	0	8.00 1.66		LOW, SLOW, CLEAR	23:00	0.00	20ML:30ML:	SUNNY, SCT-
N	LICK CREEK	06/27/91	10:00	21.0	166	0	6.10 1.58		LOW, SLOW, CLEAR	22:50	0.00	50ML:100ML:	CLEAR, B-
N	LICK CREEK	07/11/91	11:27	23.0	326	26	6.00 1.62		NORMAL, MODERATE, MURKY	22:45	0.00	25ML:82.50ML:141	OVERCAST
N	LICK CREEK	07/25/91	11:10	25.5	44	26	6.20 1.44		LOW, SLOW, CLEAR	21:40	8.25	35ML:10.25ML:11	OVERCAST
N	LICK CREEK	08/08/91	10:48	24.0	55	32	8.10 1.45		LOW, SLOW, CLEAR	23:30	6.80	35ML:16.45ML:25	CLEAR.
N	LICK CREEK	08/21/91	10:15	20.0	26	22	7.70 1.40		LOW, SLOW, CLEAR	22:55	5.70	35ML:26.25ML:12	BLK.
N	LICK CREEK	09/25/91	10:45	17.0	42	17	7.40 1.40		LOW, SLOW, CLEAR	22:30	9.80	35ML:17.50ML:21	OVC.
N	MEADOW CREEK	05/13/91	11:00	14.0	0	24	7.29 2.25		TURBID	23:00	8.10	20ML:10ML:	SUNNY.
N	MEADOW CREEK	05/30/91	9:55	18.0	112	0	7.50 1.36		MILEY	23:00	9.10	20ML:30ML:	SUNNY, SGT
N	MEADOW CREEK	06/13/91	09:56	18.0	96	0	8.00 1.12		LOW, MODERATE, MILEY	23:00	0.00	30ML:50ML:	SUNNY, SCT-
N	MEADOW CREEK	06/27/91	09:45	19.0	44	0	7.90 1.06		LOW, SLOW, CLEAR	22:50	0.00	30ML:50ML:	CLEAR, B-
N	MEADOW CREEK	07/11/91	11:10	20.5	450	24	7.40 1.34		NORMAL, MODERATE, TURBID	22:45	0.00	30ML:135.50ML:TWTC	OVERCAST+
N	MEADOW CREEK	07/25/91	11:00	23.5	63	27	8.10 1.94		LOW, SLOW, CLEAR	21:40	8.60	30ML:19.20ML:18	OVERCAST
N	MEADOW CREEK	08/08/91	10:30	32.0	25	28	8.10 .910		LOW, SLOW, CLEAR	23:30	9.20	25ML:3.35ML:9	CLEAR.
N	MEADOW CREEK	08/21/91	10:00	21.0	75	19	7.90 0.86		LOW, MODERATE, CLEAR	22:55	7.80	30ML:11.20ML:15	OVC.
N	MEADOW CREEK	09/25/91	10:30	16.0	12	17	7.80 0.86		LOW, SLOW, CLEAR	22:30	0.00	50ML:4.100ML:12	OVC.
N	LAUREL CREEK @ QUINNINONT	05/13/91	09:50	15.0	0	23	7.60 6.30		CLEAR	23:00	9.00	125:100:	SUNNY.
N	LAUREL CREEK @ QUINNINONT	05/30/91	8:50	17.5	26	0	7.30 8.08		CLEAR	23:00	0.00	20ML:30ML:	LIGHT FOG, RAZE
N	LAUREL CREEK @ QUINNINONT	06/13/91	08:42	16.5	8	0	7.90 5.95		MODERATE, CLEAR	23:00	0.00	50ML:100ML:	OVERCAST, F-
N	LAUREL CREEK @ QUINNINONT	06/27/91	08:46	18.0	32	0	7.60 6.08		LOW, SLOW, CLEAR	22:50	0.00	100ML:100ML:	CLEAR, B-
N	LAUREL CREEK @ QUINNINONT	07/11/91	10:12	21.0	79	27	7.20 6.10		NORMAL, MODERATE, MILEY	22:45	0.00	100ML:95.100ML:79	OVERCAST+

SITE_NAME	DATE	TIME	WATER_TEMP	PC_100ML	AIR_TEMP	PH	STREAM_LVL	WATER_CONC	INCUBATION	DISS_OXYGN	DILUTIONS	WEATHER	PRECIP
LAUREL CREEK @ QUINNINONT	07/25/91	09:34	22.3	48	27	7.70	5.80	NORMAL, SLOW, CLEAR	21:40	7.60	100ML:46.50ML:26	OVERCAST	0.62
LAUREL CREEK @ QUINNINONT	08/08/91	9:30	22.0	17	26	7.80	5.78	LOW, SLOW, CLEAR	23:30	8.80	50ML:6.100ML:17	UVC, B-	0.59
LAUREL CREEK @ QUINNINONT	08/21/91	9:00	19.0	2	18	8.80	5.75	LOW, MODERATE, CLEAR	22:55	8.80	100ML:2.50ML:2	UVC, L	0.00
LAUREL CREEK @ QUINNINONT	09/25/91	9:30	16.0	8	15	7.40	5.72	LOW, SLOW, CLEAR	22:30	0.00	150ML:15.200ML:17	OVC,	0.11
NEW RIVER @ PRINCE	05/13/91	09:40	19.0	0	22	7.90		TURBID	23:09	8.30	125ML:1.100ML:	SUNNY, B-	0.04
NEW RIVER @ PRINCE	05/30/91	8:25	19.0	405	0	7.30	3.80	TURBID	23:00	9.00	20ML:1.30ML:	LIGHT FOG, HAZE	0.00
NEW RIVER @ PRINCE	06/13/91	08:39	24.0	9	0	8.40	2.20	MODERATE, CLEAR	23:00	0.00	50ML:1.100ML:	OVERCAST, F-	0.14
NEW RIVER @ PRINCE	06/27/91	08:30	25.0	27	0	7.80	2.00	NORMAL, MODERATE, MURKY	22:50	0.00	100ML:1.100ML:	CLEAR, B-	0.00
NEW RIVER @ PRINCE	07/11/91	09:53	27.0	12	27	7.40	2.10	NORMAL, MODERATE, MURKY	22:45	0.00	100ML:12.50ML:7	OVERCAST+	0.39
NEW RIVER @ PRINCE	07/25/91	09:16	28.0	19	26	7.90	2.10	LOW, MODERATE, CLEAR	21:40	6.40	100ML:17.150ML:30	OVERCAST	0.62
NEW RIVER @ PRINCE	08/08/91	9:10	28.0	18	25	8.19		NORMAL, MODERATE, MURKY	23:30	7.20	100ML:20.150ML:26	OVC, B-	0.59
NEW RIVER @ PRINCE	06/21/91	8:40	26.0	16	18	7.20		LOW, MODERATE, CLEAR	22:55	7.20	100ML:12.150ML:24	OVC,	0.00
NEW RIVER @ PRINCE	09/25/91	9:15	20.0	10	14	7.50		LOW, MODERATE, MURKY	22:30	8.80	100ML:15.150ML:16	UVC, L	0.11
NEW RIVER @ PRINCE	07/25/91	09:00	23.5	1200	26	7.30	8.50	NORMAL, SWIFT, MURKY	21:40	7.90	10ML:103.5ML:60	OVERCAST	0.62
NEW RIVER @ PRINCE	08/21/91	8:20	20.0	1320	15	7.00	8.28	LOW, MODERATE, CLEAR	22:55	8.40	10ML:125.5ML:66	OVC,	0.00
NEW RIVER @ PRINCE	05/13/91	09:25	17.0	0	22	7.60	9.30	TURBID	23:09	0.01	10ML:1.20ML:	SUNNY, B-	0.04
NEW RIVER @ PRINCE	05/30/91	8:15	19.0	160	0	6.90	8.62	CLEAR	23:00	8.00	5ML:1.10ML:	LIGHT FOG, HAZE	0.00
NEW RIVER @ PRINCE	06/13/91	06:13	20.0	25	0	7.60	8.34	MODERATE, CLEAR	23:00	0.00	10ML:1.20ML:	OVERCAST, F-	0.14
NEW RIVER @ PRINCE	06/27/91	08:20	19.0	158	0	7.20	8.28	LOW, SLOW, CLEAR	22:50	0.00	30ML:1.40ML:	CLEAR, B-	0.00
NEW RIVER @ PRINCE	07/11/91	09:37	21.0	653	27	7.20	6.40	NORMAL, MODERATE, MURKY	22:45	0.00	30ML:196.40ML:THTC	OVERCAST+	0.39
NEW RIVER @ PRINCE	08/06/91	6:55	22.0	6350	24	7.60	6.58	NORMAL, SWIFT, TURBID	23:30	8.40	2ML:127.5ML:THTC	OVC, B	0.59
NEW RIVER @ PRINCE	09/25/91	8:55	16.0	90	14	6.50	8.26	LOW, MODERATE, CLEAR	22:30	9.80	5ML:4.10ML:9	OVC, L	0.11
NEW RIVER @ PRINCE	05/07/91	11:50	0.0	9	13	8.50		CLEAR	23:07	0.00	100ML:10.50ML:4	SUNNY	1.20
NEW RIVER @ PRINCE	06/04/91	9:16	18.0	44	20	7.00		CLEAR	23:08	6.90	160ML:44.100ML:64	MOSTLY SUNNY	0.20
NEW RIVER @ PRINCE	06/13/91	1:36	18.0	593	22	7.00		TURBID	24:00	0.00	20ML:116.15ML:89	SLIGHTLY OVERCAST	TRACE
NEW RIVER @ PRINCE	07/02/91	10:45	21.0	18	26	7.10		LOW, CLEAR	25:30	0.00	25ML:8.50ML:9	NOT: MURKY	0.00
NEW RIVER @ PRINCE	07/16/91	10:43	19.0	35	21	7.20		LOW, SWIFT, CLEAR	26:56	0.00	30ML:18.60ML:21	CLEAR	0.02
NEW RIVER @ PRINCE	07/30/91	10:47	20.6	247	21	7.58		LOW, SWIFT, CLEAR	22:48	8.60	75ML:105.100ML:225	CLEAR, HAZE--	0.62
NEW RIVER @ PRINCE	08/26/91	12:50	19.0	67	26	7.30		LOW, MODERATE, CLEAR	24:43	8.20	100ML:THTC 90ML:THTC	HAZE-	0.36
NEW RIVER @ PRINCE	09/17/91	1:18	21.0	4	26	7.60		LOW, MODERATE, CLEAR	24:80	7.80	100ML:3.80ML:3	SCATTERED CLOUDS	0.00
NEW RIVER @ PRINCE	05/07/91	09:35	16.6	367	9	7.80		CLEAR	23:07	0.06	50ML:152.25ML:78	SUNNY COOL	1.20
NEW RIVER @ PRINCE	06/04/91	11:42	16.6	310	21	6.00	4.54	MOSTLY MURKY	23:06	6.60	25ML:12.10ML:31	OVERCAST	0.20
NEW RIVER @ PRINCE	06/19/91	10:47	20.0	600	22	7.90	5.00	TURBID	24:80	0.00	10ML:THTC 15ML:THTC	SLIGHTLY OVERCAST	TRACE
NEW RIVER @ PRINCE	07/02/91	11:25	21.5	434	24	6.40	4.34	LOW, MODERATE, CLEAR	25:30	0.00	5ML:24.15ML:56	CLEAR	0.00
NEW RIVER @ PRINCE	07/16/91	11:30	19.0	53	27	6.20	4.29	LOW, SWIFT, MURKY	26:50	0.00	5ML:1.15ML:6	CLEAR	0.02
NEW RIVER @ PRINCE	07/30/91	11:33	26.0	1340	25	6.46	4.26	LOW, SLOW, MURKY	22:48	9.60	10ML:129.10ML:139	CLEAR	0.82
NEW RIVER @ PRINCE	08/26/91	01:30	21.6	388	38	8.40	4.10	LOW, MODERATE, CLEAR	24:43	9.40	30ML:THTC 10ML:THTC	SUNNY	0.36
NEW RIVER @ PRINCE	09/17/91	2:45	22.5	235	26	8.30	4.21	LOW, SLOW, CLEAR	24:00	6.20	20ML:46.10ML:24	SCATTERED CLOUDS	0.00
NEW RIVER @ PRINCE	05/07/91	11:05	16.5	7	12	6.50	6.56	CLEAR	23:07	6.00	100ML:6.100ML:7	SUNNY	1.20
NEW RIVER @ PRINCE	06/04/91	10:12	24.0	36	23	7.90	7.90	SLIGHTLY TURBID	23:08	6.40	100ML:36.120ML:49	PARTLY CLOUDY	0.20
NEW RIVER @ PRINCE	06/13/91	11:48	26.0	500	25	6.00	5.16	TURBID	24:00	0.00	20ML:142.15ML:75	SLIGHTLY HAZY	TRACE
NEW RIVER @ PRINCE	07/02/91	10:00	28.5	50	27	8.30	3.17	LOW, MODERATE, CLEAR	25:30	0.00	10ML:5.15ML:1	HAZY	0.00
NEW RIVER @ PRINCE	07/16/91	9:50	27.0	1	21	8.40	3.85	NORMAL, SWIFT, MURKY	26:50	0.00	20ML:0.25ML:0	CLEAR	0.02
NEW RIVER @ PRINCE	07/30/91	9:53	26.5	66	22	6.00	5.03	LOW, SLOW, MURKY	22:48	7.20	50ML:33.30ML:19	HAZE-	0.62
NEW RIVER @ PRINCE	06/26/91	11:10	25.0	66	27	8.30	1.65-	LOW, MODERATE, CLEAR	24:43	8.00	70ML:THTC 80ML:THTC	SUNNY	0.36
NEW RIVER @ PRINCE	09/17/91	11:15	26.0	14	28	6.20	0.35-	LOW, SLOW, CLEAR	24:00	7.90	75ML:7.50ML:7	SCATTERED CLOUDS	0.00
NEW RIVER @ PRINCE	05/07/91	10:20	11.2	484	12	7.00	1.28	-CLEAR	23:07	6.00	50ML:207.25ML:156	SUNNY COOL	1.20
NEW RIVER @ PRINCE	06/04/91	15:54	19.0	530	20	8.10	1.19	MOSTLY CLEAR	23:08	8.60	10ML:30.5ML:32	PARTLY CLOUDY	0.20
NEW RIVER @ PRINCE	06/19/91	12:30	18.0	3940	23	7.90	1.32	MOSTLY MURKY	24:00	0.00	5ML:197.10ML:THTC	SUNNY	TRACE
NEW RIVER @ PRINCE	07/02/91	9:25	21.0	400	22	8.20	1.09	LOW, MODERATE, CLEAR	25:30	0.00	5ML:15.10ML:40	CLEAR	0.00
NEW RIVER @ PRINCE	07/16/91	9:10	18.5	160	25	8.20	1.08	NORMAL, SWIFT, CLEAR	26:50	0.00	5ML:9.10ML:1.8	CLEAR	0.02
NEW RIVER @ PRINCE	07/30/91	09:07	19.0	330	19	8.60	1.07	LOW, SLOW, CLEAR	22:40	9.00	10ML:34.10ML:32	HAZE-	0.62
NEW RIVER @ PRINCE	08/26/91	11:53	19.0	600	23	6.20	1.06	LOW, SWIFT, CLEAR	24:43	9.00	10ML:THTC 15ML:THTC	SCATTERED HAZE-	0.36
NEW RIVER @ PRINCE	09/17/91	11:58	21.0	153	24	8.30	N/A	LOW, SWIFT, CLEAR	24:00	8.20	15ML:23.10ML:0	SCATTERED CLOUDS	0.00
NEW RIVER @ PRINCE	05/09/91	13:00	15.0	18	13	6.70		CLEAR	22:59	0.00	50ML:10.50ML:8	CLOUDY BRIZZLING	1.20
NEW RIVER @ PRINCE	05/22/91	1:32	18.0	2	25	7.30		CLEAR	25:52	9.60	100ML:1.50ML:1	SUNNY	0.00
NEW RIVER @ PRINCE	06/03/91	1:22	22.0	470	23	7.80		CLEAR	22:21	8.20	100ML:148.50ML:235	MOSTLY CLOUDY	TRACE, C.
NEW RIVER @ PRINCE	06/20/91	10:25	21.0	113	0	7.30		NORMAL, SWIFT, MURKY	24:00	0.00	100ML:113.120ML:135	OVERCAST	0.00
NEW RIVER @ PRINCE	07/01/91	11:17	24.0	12	28	8.10		LOW, MODERATE, CLEAR	23:33	0.00	50ML:6.75ML:5	CLEAR	0.00

NO	SITE NAME	DATE	TIME	WATER_TEMP	PC_100ML	AIR_TEMP	PS	STREAM_LVL	WATER_COND	INCUBATION	DISS_O2TGM	DILUTIONS	WEATHER	PRECIP.
	HANN'S CREEK	07/15/91	11:40	22.0	4	25	8.10		LOW, MODERATE, CLEAR	22:39	0.00	75ML:1 100ML:4	CLEAR	0.02
	HANN'S CREEK	07/29/91	12:09	22.0	16	23	8.00		NORMAL, SWIFT, CLEAR	22:05	7.80	100ML:12 100ML:16	OVERCAST, RAINING	0.40
	HANN'S CREEK	08/26/91	10:18	19.5	67	24	8.00		LOW, MODERATE, CLEAR	24:43	8.20	120ML:TWTC 90ML:TWTC	OVERCAST	0.36
	HANN'S CREEK	09/17/91	10:15	21.0	7	26	7.80		LOW, SLOW, CLEAR	24:00	8.70	120ML:4 100ML:7	HAZE+	0.00
	COAL RUN	05/09/91	13:30	14.0	104	13	8.90		-TURBID	22:59	0.00	50ML:48 25ML:30	CLOUDY ORIZELLING	1.20
	COAL RUN	05/22/91	1:53	10.0	108	25	7.50		SLIGHTLY MILEY	25:52	9.90	25ML:28 25ML:26	SUNNY	0.00
	COAL RUN	08/03/91	1:57	18.0	20	24	7.70		SLIGHTLY MILEY	22:21	9.40	50ML:3 25ML:5	MOSTLY CLOUDY	TRACE, 0
	COAL RUN	08/20/91	10:55	19.0	110	0	7.70		NORMAL, SWIFT, CLEAR.	24:00	0.00	50ML:64 25ML:27	OVERCAST	0.00
	COAL RUN	07/01/91	11:45	21.0	24	24	8.00		LOW, MODERATE, MILEY	23:33	0.00	25ML:6 25ML:5	CLEAR	0.00
	COAL RUN	07/15/91	12:05	19.0	20	23	7.80		LOW, MODERATE, CLEAR	22:39	0.00	25ML:4 50ML:13	CLEAR	0.02
	COAL RUN	07/29/91	11:38	20.0	120	22	7.90		NORMAL, SWIFT, MILEY	22:05	7.60	50ML:TWTC 100ML:TWTC	OVERCAST	0.40
	COAL RUN	08/20/91	9:50	20.0	400	24	7.40		LOW, MODERATE, CLEAR	24:43	9.00	20ML:TWTC 15ML:TWTC	OVERCAST	0.38
	COAL RUN	09/17/91	9:45	20.0	100	26	7.00		LOW, SLOW, CLEAR	24:00	9.30	50ML:45 30ML:33	HAZE+	0.00
	KEENEY'S CREEK	05/09/91	10:20	13.5	1493	12	8.20		CLEAR	22:59	0.00	10ML:I41 5ML:83	RAINY	1.20
	KEENEY'S CREEK	05/22/91	10:30	10.5	8000	0	8.20		CLEAR		0.00	1ML:60 5ML:TWTC	SUNNY	0.00
	KEENEY'S CREEK	08/03/91	10:05	18.0	200	20	8.80		CLEAR	22:21	8.40	1ML:2 1ML:2	OVERCAST	TRACE, 0.
	KEENEY'S CREEK	08/19/91	9:02	17.0	900	22	7.30		CLEAR	24:00	0.00	10ML:TWTC 15ML:TWTC	OVERCAST	TRACE
	KEENEY'S CREEK	07/01/91	9:10	18.0	14900	25	7.10		LOW, MODERATE, CLEAR	23:33	0.00	1ML:149 5ML:TWTC	CLEAR	0.00
	KEENEY'S CREEK	07/15/91	9:17	22.0	2300	19	7.20		LOW, MODERATE, CLEAR	22:39	0.00	0.5ML:14 1ML:23	CLEAR	0.02
	KEENEY'S CREEK	07/29/91	09:23	20.0	6000	22	7.20		LOW, MODERATE, CLEAR	22:05	5.80	1ML:TWTC 1ML:TWTC	OVERCAST	0.40
	KEENEY'S CREEK	08/27/91	09:15	20.0	17000	22	8.50		LOW, SLOW, CLEAR	24:05	3.00	1ML:110 0.5ML:85	OVERCAST	0.00
	KEENEY'S CREEK	09/09/91	9:24	17.5	2250	19	7.50		LOW, MODERATE, CLEAR	23:40	7.60	0.8ML:8 0.4ML:9	HAZE-	0.00
	NEW RIVER @ PAYETTE STATION	05/09/91	11:50	10.8	805	12	7.90 4.41		MURKY	22:59	0.00	125ML:17 100ML:9	RAINY	1.20
	NEW RIVER @ PAYETTE STATION	05/22/91	12:55	19.0	120	24	7.40 8.83		TURBID	25:52	9.20	10ML:10 10ML:12	SUNNY	0.00
	NEW RIVER @ PAYETTE STATION	08/03/91	11:32	25.0	83	23	7.80 4.36		MILEY	22:21	8.20	75ML:47 50ML:97	OVERCAST	TRACE, 0.
	NEW RIVER @ PAYETTE STATION	08/19/91	10:20	25.0	1410	25	8.00 2.19		TURBID	24:00	0.00	10ML:180 10ML:141	SLIGHTLY RAINY	TRACE
	NEW RIVER @ PAYETTE STATION	07/01/91	10:07	28.5	400	29	8.30 1.08		LOW, MODERATE, MILEY	23:33	0.00	1ML:4 5ML:2	CLEAR	0.00
	NEW RIVER @ PAYETTE STATION	07/15/91	10:20	20.0	0	24	8.40 0.204		NORMAL, MODERATE, MILEY	22:39	0.00	50ML:4 25ML:1	CLEAR	0.02
	NEW RIVER @ PAYETTE STATION	07/29/91	10:33	20.0	17	24	8.30 2.65		NORMAL, MODERATE, MILEY	22:05	7.80	100ML:12 75ML:12	OVERCAST	0.40
	NEW RIVER @ PAYETTE STATION	08/27/91	10:30	27.0	28	28	8.50 1.90		LOW, SLOW, MURKY -	24:05	8.20	100ML:33 110ML:27	SCATTERED CLOUDS +	0.00
	NEW RIVER @ PAYETTE STATION	09/09/91	10:34	24.0	10	22	8.40 0.55-		LOW, SLOW, CLEAR	23:40	8.20	100ML:4 125ML:13	SCATTERED CLOUDS	0.00
	WOLF CREEK	05/09/91	11:30	14.0	208	12	7.20		-MURKY	22:59	0.00	50ML:15 25ML:13	RAINY	1.20
	WOLF CREEK	05/22/91	11:55	15.5	10	24	7.80		SLIGHTLY MILEY	25:52	0.00	50ML:8 50ML:9	SUNNY	0.00
	WOLF CREEK	08/03/91	11:17	10.0	300	22	7.00		MILEY	22:21	0.00	50ML:183 25ML:75	OVERCAST	TRACE, 0.2
	WOLF CREEK	08/19/91	10:15	10.0	300	24	7.90		MOSTLY TURBID	24:00	0.00	20ML:TWTC 25ML:TWTC	HAZEY	TRACE
	WOLF CREEK	07/01/91	9:55	19.0	52	20	8.30		LOW, MODERATE, CLEAR	23:33	0.00	10ML:5 25ML:13	CLEAR	0.00
	WOLF CREEK	07/15/91	10:15	10.0	65	22	8.30		LOW, MODERATE, CLEAR	22:39	0.00	15ML:7 20ML:13	CLEAR	0.02
	WOLF CREEK	07/29/91	10:19	19.0	78	24	8.40		NORMAL, SWIFT, CLEAR	22:05	9.20	30ML:21 50ML:41	OVERCAST	0.40
	WOLF CREEK	08/27/91	10:25	10.5	280	23	8.00		LOW, SWIFT, CLEAR	24:05	1.06	50ML:23 40ML:29	SCATTERED CLOUDS, OVERCAST	0.00
	WOLF CREEK	09/09/91	10:24	10.0	20	19	8.30		LOW, SLOW, CLEAR	23:40	9.50	50ML:1 40ML:8	SCATTERED CLOUDS	0.00
	HARR BRANCH	05/09/91	11:05	14.2	333	12	8.20 0.78		MURKY	22:59	0.00	5ML:10 1ML:2	RAINY	1.25
	HARR BRANCH	08/03/91	10:45	10.5	140	20	8.90 1.08		MOSTLY TURBID	22:21	8.50	5ML:7 1ML:1	OVERCAST	TRACE, 0.
	HARR BRANCH	08/19/91	9:45	18.0	400	22	8.00 1.33		MOSTLY TURBID	24:00	0.00	15ML:TWTC 20ML:TWTC	HAZEY	TRACE
	HARR BRANCH	07/01/91	12:40	23.0	8000	27	7.00		LOW, MODERATE, MURKY	23:33	0.00	1ML:TWTC 5ML:TWTC	CLEAR	0.00
	HARR BRANCH	07/15/91	9:45	21.5	8000	21	7.20 0.58		LOW, SLOW, MURKY	22:39	0.00	1ML:TWTC 1ML:TWTC	CLEAR	0.02
	HARR BRANCH	07/29/91	9:54	20.0	32000	22	7.80 0.81		NORMAL, SWIFT, MILEY	22:05	2.20	0.1ML:32 0.3ML:93	OVERCAST	0.40
	HARR BRANCH	08/27/91	10:02	21.0	80000	21	7.50 0.44		LOW, SWIFT, MILEY	24:05	0.20	0.2ML:TWTC 0.1ML:TWTC	OVERCAST	0.00
	HARR BRANCH	09/09/91	9:55	18.0	5000	19	7.60 0.55-		LOW, SWIFT, CLEAR	23:40	2.00	0.2ML:10 0.1ML:4	HAZE-	0.00

661.62

NO	SITE_NAME	DATE	COMMENTS	SITE_NO	SITE_NAME	DATE	COMMENTS
	NEW RIVER @ HINTON VC	05/13/91	SAMPLE DID NOT TURN OUT-SAMPLE GOT WATER LOGGED. DO METER DID NOT WORK.	04N	NEW RIVER @ SANDSTONE	05/13/91	SAMPLE DID NOT TURN OUT-SAMPLE GOT WATER LOGGED.
	NEW RIVER @ HINTON VC	05/30/91		04N	NEW RIVER @ SANDSTONE	05/30/91	SAMPLE DIDNT TURN OUT BECAUSE OF TREMENDOUS GROWTH OF YELLOW BACTERIA
	NEW RIVER @ HINTON VC	06/13/91	DO METER IN SHOP.	04N	NEW RIVER @ SANDSTONE	06/13/91	DO METER IN SHOP.
	NEW RIVER @ HINTON VC	06/27/91	DO METER IN SHOP, RAN ON PRE AND POST CONTROL, BATTERIES DOWN IN COND. METER	04N	NEW RIVER @ SANDSTONE	06/27/91	DO METER IN SHOP, RAN ON PRE AND POST CONTROL, CONDUCTIVITY OF 155.
	NEW RIVER @ HINTON VC	07/11/91	DO METER IN SHOP. CONDUCTIVITY IS 145	04N	NEW RIVER @ SANDSTONE	07/11/91	DO METER IN SHOP. CONDUCTIVITY IS 125
	NEW RIVER @ HINTON VC	07/25/91	CONDUCTIVITY IS 165.	04N	NEW RIVER @ SANDSTONE	07/25/91	CONDUCTIVITY IS 170.
	NEW RIVER @ HINTON VC	08/08/91	CONDUCTIVITY IS 165. (HINTON GAGE AT DAN 2.2) CSP=4000	04N	NEW RIVER @ SANDSTONE	08/08/91	CONDUCTIVITY IS 152.
	NEW RIVER @ HINTON VC	08/21/91	CONDUCTIVITY IS 155. PC/100ML IS ESTIMATED. PC/100ML IS 36.5.	04N	NEW RIVER @ SANDSTONE	08/21/91	CONDUCTIVITY IS 150. PC/100ML IS ESTIMATED.
	NEW RIVER @ HINTON VC	09/25/91	CONDUCTIVITY IS 150. PC/100ML IS ESTIMATED. HINTON GAGE 1.7--BLUESTONE DAN 140CSF. PC/100ML IS 11.33	04N	NEW RIVER @ SANDSTONE	09/25/91	CONDUCTIVITY IS 150. PC/100ML IS ESTIMATED. DO READING IS 10.2.
	NADAN CREEK	05/13/91	SAMPLE DID NOT TURN OUT-SAMPLE GOT WATER LOGGED. DO METER DID NOT WORK.	05T	LICK CREEK	05/13/91	SAMPLE DID NOT TURN OUT-SAMPLE GOT WATER LOGGED. DO METER DID NOT WORK.
	NADAN CREEK	05/30/91		05T	LICK CREEK	05/30/91	
	NADAN CREEK	06/13/91	DO METER IN SHOP. PC/100ML >300.	05T	LICK CREEK	06/13/91	DO METER IN SHOP
	NADAN CREEK	06/27/91	DO METER IN SHOP. RAN ON PRE AND POST CONTROL, BATTERIES DOWN IN COND. METER	05T	LICK CREEK	06/27/91	DO METER IN SHOP, RAN ON PRE AND POST CONTROL, CONDUCTIVITY OF 230.
	NADAN CREEK	07/11/91	DO METER IN SHOP. CONDUCTIVITY IS 170	05T	LICK CREEK	07/11/91	DO METER IN SHOP. NO CONDUCTIVITY.
	NADAN CREEK	07/25/91	CONDUCTIVITY IS 240.	05T	LICK CREEK	07/25/91	CONDUCTIVITY IS 400.
	NADAN CREEK	08/08/91	CONDUCTIVITY IS 225. PC/100ML IS ESTIMATED.	05T	LICK CREEK	08/08/91	CONDUCTIVITY IS 400. PC/100ML IS 55.6. PC/100ML IS ESTIMATED.
	NADAN CREEK	08/21/91	CONDUCTIVITY IS 230. PC/100ML IS ESTIMATED.	05T	LICK CREEK	08/21/91	CONDUCTIVITY IS 400. PC/100ML IS ESTIMATED.
	NADAN CREEK	09/25/91	CONDUCTIVITY IS 320. PC/100ML IS ESTIMATED.	05T	LICK CREEK	09/25/91	CONDUCTIVITY IS 420. PC/100ML IS ESTIMATED.
	NEW RIVER @ HINTON SEWAGE TP	05/13/91	SAMPLE DID NOT TURN OUT-SAMPLE GOT WATER LOGGED. DO METER DID NOT WORK.	06T	MEADOW CREEK	05/13/91	SAMPLE DID NOT TURN OUT-SAMPLE GOT WATER LOGGED.
	NEW RIVER @ HINTON SEWAGE TP	05/30/91	NO DO RECORDED	06T	MEADOW CREEK	05/30/91	
	NEW RIVER @ HINTON SEWAGE TP	06/13/91	DO METER IN SHOP. SAMPLES OF <10ML ADDED 20ML OF DILUTION, PC/100ML >6000.	06T	MEADOW CREEK	06/13/91	DO METER IN SHOP
	NEW RIVER @ HINTON SEWAGE TP	06/27/91	DO METER IN SHOP, RAN ON PRE AND POST CONTROL, CONDUCTIVITY OF 160.	06T	MEADOW CREEK	06/27/91	DO METER IN SHOP, RAN ON PRE AND POST CONTROL, CONDUCTIVITY IS 150.
	NEW RIVER @ HINTON SEWAGE TP	07/11/91	DO METER IN SHOP. CONDUCTIVITY IS 190, PH IS NOT SHOWN, PC WHERE >20,000 PER 100ML	06T	MEADOW CREEK	07/11/91	DO METER IN SHOP. NO CONDUCTIVITY.
	NEW RIVER @ HINTON SEWAGE TP	07/25/91	CONDUCTIVITY IS 190.	06T	MEADOW CREEK	07/25/91	CONDUCTIVITY IS 180.
	NEW RIVER @ HINTON SEWAGE TP	08/08/91	CONDUCTIVITY IS 152. PC/100ML IS ESTIMATED.	06T	MEADOW CREEK	08/08/91	CONDUCTIVITY IS 220. PC/100ML IS 25.7. PC/100ML IS ESTIMATED.
	NEW RIVER @ HINTON SEWAGE TP	08/21/91	CONDUCTIVITY IS 140. PC/100ML IS ESTIMATED.	06T	MEADOW CREEK	08/21/91	CONDUCTIVITY IS 225. PC/100ML IS ESTIMATED.
	NEW RIVER @ HINTON SEWAGE TP	09/25/91	CONDUCTIVITY IS 170. PC/100ML IS ESTIMATED. DO READING IS 10.4.	06T	MEADOW CREEK	09/25/91	CONDUCTIVITY IS 230. PC/100ML IS ESTIMATED. DO READING IS 10.6.
				07T	LAUREL CREEK @ QUINNIMONT	05/13/91	SAMPLE DID NOT TURN OUT-SAMPLE GOT WATER LOGGED.
				07T	LAUREL CREEK @ QUINNIMONT	05/30/91	DO READING LONG/L
				07T	LAUREL CREEK @ QUINNIMONT	06/13/91	DO METER IN SHOP
				07T	LAUREL CREEK @ QUINNIMONT	06/27/91	DO METER IN SHOP. RAN ON PRE

SITE_NO	SITE_NAME	DATE	COMMENTS	SITE_NO	SITE_NAME	DATE	COMMENTS
			AND POST CONTROL, CONDUCTIVITY IS 106.	11T	DUNLOP CREEK	07/16/91	PC/100 IS ESTIMATED. CONDUCTIVITY IS 430.
07T	LAUREL CREEK @ QUINNINONT	07/11/91	DO METER IN SHOP. CONDUCTIVITY IS 132.	11T	DUNLOP CREEK	07/30/91	PC/100 IS ESTIMATED. CONDUCTIVITY IS >500.
07T	LAUREL CREEK @ QUINNINONT	07/25/91	CONDUCTIVITY IS 169.	11T	DUNLOP CREEK	08/26/91	PC/100ML IS ESTIMATED. CONDUCTIVITY IS 500+.
07T	LAUREL CREEK @ QUINNINONT	08/08/91	CONDUCTIVITY IS 170. PC/100ML IS ESTIMATED.	11T	DUNLOP CREEK	09/17/91	CONDUCTIVITY IS 235.
07T	LAUREL CREEK @ QUINNINONT	08/21/91	CONDUCTIVITY IS 145. PC/100ML IS ESTIMATED.	12N	NEW RIVER @ THURMOND	05/07/91	DO WAS 10.3 mg/L
07T	LAUREL CREEK @ QUINNINONT	09/25/91	CONDUCTIVITY IS 170. PC/100ML IS ESTIMATED. PC/100ML IS 8.5. DO READING IS 10.2.	12N	NEW RIVER @ THURMOND	06/04/91	PC/100 IS ESTIMATED. CONDUCTIVITY IS 150.
08N	NEW RIVER @ PRINCE	05/13/91	SAMPLE DID NOT TURN OUT-SAMPLE GOT WATER LOGGED.	12N	NEW RIVER @ THURMOND	07/16/91	PC/100 IS ESTIMATED. CONDUCTIVITY IS 155. PC'S A <1.
08N	NEW RIVER @ PRINCE	05/30/91		12N	NEW RIVER @ THURMOND	07/30/91	CONDUCTIVITY IS 150
08N	NEW RIVER @ PRINCE	06/13/91	DO METER IN SHOP	12N	NEW RIVER @ THURMOND	08/26/91	PC/100ML IS ESTIMATED. CONDUCTIVITY IS 155.
08N	NEW RIVER @ PRINCE	06/27/91	DO METER IN SHOP. RAN ON PRE AND POST CONTROL, CONDUCTIVITY IS 132.	12N	NEW RIVER @ THURMOND	09/17/91	PC/100ML IS ESTIMATED. CONDUCTIVITY IS 175.
08N	NEW RIVER @ PRINCE	07/11/91	DO METER IN SHOP. CONDUCTIVITY IS 156.	13T	ARBuckle CREEK	05/07/91	DO WAS 11.3mg/L
08N	NEW RIVER @ PRINCE	07/25/91	CONDUCTIVITY IS 170.	13T	ARBuckle CREEK	06/04/91	
08N	NEW RIVER @ PRINCE	08/08/91	CONDUCTIVITY IS 150. PC/100ML IS 10.7.	13T	ARBuckle CREEK	06/19/91	PC/100 IS ESTIMATED. CONDUCTIVITY IS 400.
08N	NEW RIVER @ PRINCE	08/21/91	CONDUCTIVITY IS 150.	13T	ARBuckle CREEK	07/02/91	PC/100 IS ESTIMATED. CONDUCTIVITY IS 400
08N	NEW RIVER @ PRINCE	09/25/91	CONDUCTIVITY IS 170. PC/100ML IS ESTIMATED. PC/100ML IS 10.6.	13T	ARBuckle CREEK	07/16/91	PC/100 IS ESTIMATED. CONDUCTIVITY IS 470
09N	PINEY CREEK	07/25/91	CONDUCTIVITY IS 330.	13T	ARBuckle CREEK	07/30/91	PC/100ML IS ESTIMATED. CONDUCTIVITY IS 550.
09N	PINEY CREEK	08/21/91	CONDUCTIVITY IS 358. PC/100ML IS ESTIMATED. COUNT 1320/100ML	13T	ARBuckle CREEK	08/26/91	CONDUCTIVITY IS 550.
09T	PINEY CREEK	05/13/91	DO READING 11.2. SAMPLE DID NOT TURN OUT-SAMPLE GOT WATER LOGGED.	14T	WANN'S CREEK	09/17/91	CONDUCTIVITY IS 153.
09T	PINEY CREEK	05/30/91		14T	WANN'S CREEK	05/09/91	DO METER NOT WORKING
09T	PINEY CREEK	06/13/91	DO METER IN SHOP	14T	WANN'S CREEK	05/22/91	PC/100ML IS ESTIMATED.
09T	PINEY CREEK	06/27/91	DO METER IN SHOP. RAN ON PRE AND POST CONTROL, CONDUCTIVITY IS 310.	14T	WANN'S CREEK	06/03/91	PC/100ML IS ESTIMATED.
09T	PINEY CREEK	07/11/91	DO METER IN SHOP. CONDUCTIVITY IS 310.	14T	WANN'S CREEK	06/20/91	CONDUCTIVITY IS 220.
09T	PINEY CREEK	08/08/91	CONDUCTIVITY IS 280.	14T	WANN'S CREEK	07/01/91	PC/100 IS ESTIMATED.
09T	PINEY CREEK	09/25/91	CONDUCTIVITY IS 330.	14T	WANN'S CREEK	07/15/91	CONDUCTIVITY IS 250.
10T	SLATER'S CREEK	05/07/91	NO DO READING WAS TAKEN	14T	WANN'S CREEK	07/29/91	PC/100 IS ESTIMATED. CONDUCTIVITY IS 160.
10T	SLATER'S CREEK	06/04/91		14T	WANN'S CREEK	08/26/91	PC/100ML IS ESTIMATED. CONDUCTIVITY IS 260.
10T	SLATER'S CREEK	06/19/91	PC/100 IS ESTIMATED. 20HRS. AFTER A SEVERE RUMOFF.	14T	WANN'S CREEK	09/17/91	PC/100ML IS ESTIMATED. CONDUCTIVITY IS 230
10T	SLATER'S CREEK	07/02/91	CONDUCTIVITY IS 49.	15T	COAL RUN	05/09/91	DO METER NOT WORKING
10T	SLATER'S CREEK	07/16/91	PC/100 IS ESTIMATED. CONDUCTIVITY IS 50	15T	COAL RUN	05/22/91	
10T	SLATER'S CREEK	07/30/91	CONDUCTIVITY IS 50	15T	COAL RUN	06/03/91	
10T	SLATER'S CREEK	08/26/91	PC/100ML IS ESTIMATED. CONDUCTIVITY IS 60.	15T	COAL RUN	06/20/91	
10T	SLATER'S CREEK	09/17/91	PC/100ML IS ESTIMATED. CONDUCTIVITY IS 75. PC/100ML ACTUALLY WORKED OUT TO 3.75.	15T	COAL RUN	07/01/91	CONDUCTIVITY IS 425.
11T	DUNLOP CREEK	05/07/91	DO WAS 11.2 mg/L	15T	COAL RUN	07/15/91	PC/100 IS ESTIMATED. CONDUCTIVITY IS UNKNOWN
11T	DUNLOP CREEK	06/04/91		15T	COAL RUN	07/29/91	PC/100 IS ESTIMATED. CONDUCTIVITY IS 430. PRECAL COUNT IS >120/100ML.
11T	DUNLOP CREEK	06/19/91	PRECAL COUNT >600/100ML.	15T	COAL RUN	08/26/91	PC/100ML IS ESTIMATED. CONDUCTIVITY IS 435.
11T	DUNLOP CREEK	07/02/91	CONDUCTIVITY IS 350.	15T	KENNEY'S CREEK	09/17/91	CONDUCTIVITY IS 100.
				15T	KENNEY'S CREEK	05/09/91	DO METER NOT WORKING
				15T	KENNEY'S CREEK	05/22/91	PC/100ML IS ESTIMATED. DISSOLVED OXYGEN=11.0MG/L.
				15T	KENNEY'S CREEK	06/03/91	PRECAL COLONIES GREW ON OUTSIDE

TE_NO	SITE_NAME	DATE	COMMENTS	SITE_NO	SITE_NAME	DATE	COMMENTS
			EDGE OF DISH ONLY.				CONDUCTIVITY IS 1100. BLACK
	KRENEY'S CREEK	06/19/91	FECAL COUNTS >600/100ML				MILKY COLOR. SMELLS BAD.
	KRENEY'S CREEK	07/01/91	CONDUCTIVITY=185	19T	WARR BRANCH	09/09/91	PC/100ML IS ESTIMATED.
	KRENEY'S CREEK	07/15/91	PC/100 IS ESTIMATED.				CONDUCTIVITY IS 800.
			CONDUCTIVITY IS 210				
	KRENEY'S CREEK	07/29/91	PC/100 IS ESTIMATED.				
			CONDUCTIVITY IS 220.				
	KRENEY'S CREEK	08/27/91	PC/100ML IS ESTIMATED.				
			CONDUCTIVITY IS 270. CREEK				
			VERY LOW. LITTLE FLOW EXISTS.				
			THERE IS AN ALGAL				
	KRENEY'S CREEK	09/09/91	PC/100ML IS ESTIMATED.				
			CONDUCTIVITY IS 250.				
	NEW RIVER @ PAYETTE STATION	05/09/91	DO METER NOT WORKING				
	NEW RIVER @ PAYETTE STATION	05/22/91	PC/100ML IS ESTIMATED.				
	NEW RIVER @ PAYETTE STATION	06/03/91	LOOKED LIKE A TYPICAL SAMPLE.				
	NEW RIVER @ PAYETTE STATION	06/19/91	PC/100 IS ESTIMATED.				
	NEW RIVER @ PAYETTE STATION	07/01/91	CONDUCTIVITY IS 450.				
	NEW RIVER @ PAYETTE STATION	07/15/91	PC/100 IS ESTIMATED.				
			CONDUCTIVITY IS 162				
	NEW RIVER @ PAYETTE STATION	07/29/91	PC/100 IS ESTIMATED.				
			CONDUCTIVITY IS 150.				
	NEW RIVER @ PAYETTE STATION	08/27/91	PC/100ML IS ESTIMATED.				
			CONDUCTIVITY IS 160.				
	NEW RIVER @ PAYETTE STATION	09/09/91	PC/100ML IS ESTIMATED.				
			CONDUCTIVITY IS 190. PC/100				
			ACTUALLY WORKED OUT TO 10.4.				
18T	WOLF CREEK	05/09/91	DO METER NOT WORKING				
18T	WOLF CREEK	05/22/91	PC/100ML IS ESTIMATED.				
			DISSOLVED OXYGEN=10.2MG/L.				
18T	WOLF CREEK	06/03/91	FECAL COLONY GROWTH ON OUTSIDE				
			EDGE OF DISH ONLY.				
			DISSOLVED				
			OXYGEN=10.4MG/L.				
18T	WOLF CREEK	06/19/91	FECAL COUNT >300/100ML; STREAM				
			HIGH 12-15HRS. POST RAINSTORM.				
18T	WOLF CREEK	07/01/91	CONDUCTIVITY IS 450.				
18T	WOLF CREEK	07/15/91	PC/100 IS ESTIMATED.				
			CONDUCTIVITY IS 450				
18T	WOLF CREEK	07/29/91	PC/100 IS ESTIMATED.				
			CONDUCTIVITY IS 500.				
18T	WOLF CREEK	08/27/91	PC/100ML IS ESTIMATED.				
			CONDUCTIVITY IS 500+.				
18T	WOLF CREEK	09/09/91	PC/100ML IS ESTIMATED.				
			CONDUCTIVITY IS 600.				
19T	WARR BRANCH	05/09/91	DO METER NOT WORKING				
19T	WARR BRANCH	06/03/91	FECAL COLONY GROWTH ON OUTSIDE				
			EDGE OF DISH ONLY.				
19T	WARR BRANCH	06/19/91	FECAL COUNT >400/100ML; STREAM				
			IS HIGH 12-15HRS AFTER HEAVY				
			RAINSTORM.				
19T	WARR BRANCH	07/01/91	STREAM RUNNING VERY BLACK; BAD				
			CONDITION; FECAL COUNT TWTG.				
			CONDUCTIVITY=600				
19T	WARR BRANCH	07/15/91	PC/100 IS ESTIMATED.				
			CONDUCTIVITY IS 580				
19T	WARR BRANCH	07/29/91	PC/100 IS ESTIMATED.				
			CONDUCTIVITY IS 500.				
19T	WARR BRANCH	08/27/91	PC/100ML IS ESTIMATED.				

Introduction

This report presents the data from the 1991 fecal coliform study for the Bluestone National Scenic River and the Gauley River National Recreation Area and is a continuation of the water quality studies conducted at the New River Gorge National River (NERI) since 1980. Any visible trends between fecal coliform counts and stage level and 48 hour precipitation (48prop.) will be discussed and recommendations for 1992 will be presented.

NERI was established by the United States Congress in 1978 and placed under management of the National Park Service (NPS), part of the United States Department of the Interior. A 62,000 acre corridor along 52 miles of New River was set aside ". . . to conserve and interpret the outstanding natural, scenic, and historic values and objects in and around the New River Gorge and preserve as a free-flowing stream an important segment of the New River in West Virginia for the benefit and enjoyment of future generations. . ." (WVDNR 1987-88, p.1). On October 26, 1988 the United States Congress approved Public Law 100-534. Title II, Section 201 of this act established the Gauley River National Recreation Area (GARI). Title III, Section 301 designated the Lower Bluestone as a Wild and Scenic River (BLUE). The purpose of the public law was "an act to protect and enhance the natural, scenic, cultural, and recreational values of certain segments of the New, Gauley, Meadow and Bluestone Rivers in West Virginia for the benefit of present and future generations, and for other purposes." Since this law was enacted NERI has been in the process of developing and managing these two areas in accordance with their lawful designations.

Bluestone National Scenic River is a 10.5 mile stretch, in Summers and Mercer Counties, on the lower section of the Bluestone River. The scenic river flows northeast through a pristine corridor from the southern boundary of Pipestem State Park to one half mile upstream (south) of the Bluestone State Park Boundary (see Figure 1). This downstream (northern) border corresponds with the summer pool elevation, 1410 feet above sea level, of Bluestone Lake (Reservoir). The upper (southern) 3.5 miles of the BLUE lie within the boundaries of Pipestem State Park, the last 7.0 miles lie within the Bluestone Public Hunting and Fishing area (Sprague report 1991, p. 1).

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